ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose "NO CHANGE." In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

Take Me Outside to the Ball Game

My sons are fortunate to have grown up in a city where major league baseball is played. When I was a child, it was a five-hour, once-a-summer trek, 1 to the nearest major league ballpark. My sons have to endure only the twenty-minute ride to the stadium that we make five or six times a year. But I think my experience needless to say was 2 richer than theirs. The stadium I remember had a natural grass field and seats piled up high and close to the players so we could hear them mutter. Domed and bowl-shaped, my sons sit in a park 3 where the players meander about on artificial turf that is not natural grass, 4 and where we sat 5 at such a distance that the game appears to be only a rumor. Fans should not have to endure these errors in aesthetics and architecture? 6

1. **A.** NO CHANGE
   B. child, it was a five-hour, once-a-summer trek
   C. child, it was a five-hour once-a-summer, trek
   D. child it was a five-hour once-a-summer trek,

2. **F.** NO CHANGE
   G. experience was
   H. experience, needless to say, was
   J. experience can be considered to be

3. **A.** NO CHANGE
   B. My sons sit, in a park, domed and bowl-shaped
   C. My sons in a park sit domed and bowl-shaped
   D. My sons sit in a domed, bowl-shaped park

4. **F.** NO CHANGE
   G. that is not real,
   H. that's not grass
   J. OMIT the underlined portion.

5. **A.** NO CHANGE
   B. would set
   C. sit
   D. were sitting

6. **F.** NO CHANGE
   G. in aesthetics, and architecture?
   H. in aesthetics and architecture.
   J. in, aesthetics and architecture!

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First, the turf should go. There should be nothing artificial about baseball, least of all the grass. The odd green shade of artificial turf is a poor counterfeit of grass green. $\underset{7}{\underline{\text{When}}}$ my sons and I visit the ballpark we are $\underset{8}{\underline{\text{essential on}}}$ a picnic. Why gather around a carpet, $\underset{9}{\underline{\text{in which}}}$ we can do just as well at home, to enjoy our hot dogs, peanuts, and sodas? $\boxed{10}$

Second, the dome should go. $\underset{11}{\underline{\text{While it's true}}}$ that the dome blocks out rain, it also blocks out the sun and sky. Baseball is a pastoral sport, where players lope across the field, where a strong player can smack a ball seemingly to the sky. Under a dome, the game is hermetically sealed, the players' skins look sickly, and the hit ball is in danger of banging a rafter. $\underset{12}{\underline{\text{Finally,}}}$ I want my sons to be closer to the game. I don't want us to be forced to the $\underset{13}{\underline{\text{edge, of a bowled stadium, like}}}$ the remnants of unwanted cereal. I want us to hear the ball slapping the catcher's mitt, and the shortstop yelling "I got it!" when the ball is popped up in the infield. Let us study an $\underset{14}{\underline{\text{outfielders face,}}}$ without the

7. **A.** NO CHANGE
B. Afterwards, when
C. Then, when
D. Thus, when

8. **F.** NO CHANGE
G. more essentially on
H. more essential to
J. essentially on

9. **A.** NO CHANGE
B. in being
C. which
D. OMIT the underlined portion.

10. Which of the following sentences, if added here, would best reflect the point made in this paragraph?

F. Baseball is great.
G. We all need to get outside more.
H. We love hot dogs.
J. Give us the smell of fresh-mown grass.

11. **A.** NO CHANGE
B. Since it's
C. For it's
D. It's

12. **F.** NO CHANGE
G. (Do NOT begin new paragraph) Thus,
H. (Begin new paragraph) Finally,
J. (Begin new paragraph) For example,

13. **A.** NO CHANGE
B. edge of a bowled stadium, like,
C. edge of a bowled stadium like,
D. edge of a bowled stadium, like

14. **F.** NO CHANGE
G. outfielder's face,
H. outfielders' face,
J. outfielders face's,

aid of binoculars. When he's sprinting toward the infield to catch a short fly ball. 15

Baseball is a game as much about atmosphere as athletics. Architects need to remember stadiums are playgrounds, not office buildings. If architects play fair, they will remember that, and my grandchildren will be thankful when they take their seats in the bleachers.

15. **A.** NO CHANGE
B. binoculars! When
C. binoculars; when
D. binoculars, when

PASSAGE II

Bombay Parcel Post

[1]

Recently, while visiting a friend in the bustling city of Bombay, India, I discovered that mailing a package could be a very complicated, and instructive, process. I had bought some souvenirs there that I wanted to send home. My friend, a young man who had lived in Bombay his entire life except a few years spent studying in the United States, if he were to walk with me to the post office. 16 17

[2]

Merchants of all types were selling piles of cut sugarcane, colorfully dyed cloth, metal kitchen utensils, as well as many items I could not identify. By pulling carts, oxen were amidst the automobile traffic. Men on bicycle rickshaws jingled bells to attract business and warn other drivers of their presence. People crowded the narrow streets, conversing, carrying on business, or just sitting and 18

16. **F.** NO CHANGE
G. with the exceptance of
H. with the excepting of
J. yet for

17. **A.** NO CHANGE
B. walked
C. if he would walk
D. is walking

18. **F.** NO CHANGE
G. Oxen pulled carts amidst
H. Oxen pulled carts, being amidst
J. Oxen were amidst while pulling carts in

watching the passing scene. $\boxed{19}$

[3]

[1] We stopped outside the front gate of the large governmental post $\underset{20}{\underline{\text{office of some size, and}}}$ my friend showed me what to do. [2] We walked up to a line of workers, who were waiting patiently along a fence. [3] $\underset{21}{\underline{\text{She carefully cut}}}$ a piece of cotton cloth from a large bolt of the material. [4] She wrapped the package in it—a perfect fit! [5] I handed my $\underset{22}{\underline{\text{package which I wanted to mail,}}}$ to the first person in line. $\boxed{23}$

[4]

The man next to her took my package and carefully sewed the edges of the cloth with thick, black thread. $\boxed{24}$ My package was then passed to the next person in line, who with equal $\underset{25}{\underline{\text{care, he sealed}}}$ its edges with small circles of melted red wax, which quickly hardened in place. When the bundle was prepared, I took it inside to the mail counter, where it was weighed, stamped,

19. Which of the following sentences, if added at the beginning of Paragraph 2, would most effectively introduce the new subject of the paragraph?

A. Our path took us through a clash and jangle of activity.
B. It's interesting how post offices operate in other parts of the world.
C. I was surprised to see that oxen were still used to pull carts.
D. The rickshaw drivers were the busiest people on the streets.

20. **F.** NO CHANGE
G. office, which was quite sizable, and
H. office, so sizable that
J. office, and

21. Which of the choices would NOT be acceptable here?

A. She carefully cut (NO CHANGE)
B. She cut careful
C. Carefully she cut
D. She cut with care

22. **F.** NO CHANGE
G. package, intending to mail it
H. package to be mailed
J. package

23. For the sake of the unity and coherence of Paragraph 3, Sentence 5 should be placed:

A. where it is now.
B. after Sentence 1.
C. after Sentence 2.
D. after Sentence 3.

24. The writer wants to add a sentence here that would further exemplify the worker's care and attention to his task. Given all are true, which of the following would most effectively accomplish this?

F. He paused often to talk to me and my friend.
G. The heavy thread made a very noticeable seam.
H. He took the time to line up each short, tight stitch.
J. It seemed that he took great pride in his work.

25. **A.** NO CHANGE
B. care to seal
C. care sealing
D. care sealed

and sent on its way. [26]

[5]

The cost of this entire process was very reasonable, and it took over an hour. During that time, as 27 I talked to the workers—with my friend's help— 28 in Hindi. One man returned my interest, and said, 29 to me, "We will teach you how to do this if you wish. I am sure that with a little practice you could learn." [30] I gratefully declined.

PASSAGE III

So You Want to Be in Show Business

[1]

The actors who perform in television commercials are some of the most fortunate people in show business. But their faces aren't as well known as are most movie actors'. 31 Television commercials are big business. The average two-minute national commercial has a shooting budget greater than budgets for some movies. A performer could live for a year on the wages earned from a single commercial.

26. In order to emphasize the pride the workers took in wrapping the narrator's package, the writer intends to add to the preceding sentence the following phrase:

to their satisfaction

The phrase would most effectively serve the above-stated purpose if added after the:

F. word *prepared* and before the comma.
G. words *took it.*
H. word *counter* and before the comma.
J. words *it was.*

27. A. NO CHANGE
B. time, when
C. time,
D. time that

28. F. NO CHANGE
G. friends help—
H. friends' help—
J. friends help

29. A. NO CHANGE
B. interest and said
C. interest; and said
D. interest and said,

30. Which of the following sentences, if added at this point, would most directly convey to the reader the impression that the post office workers do not actually think the narrator could learn how to prepare packages for the mail?

F. He smiled mischievously, and the others chuckled.
G. The workers all seemed happy to help.
H. They made it seem so simple that for a moment I thought about giving it a try.
J. Their warm, friendly expressions led me to take them at their word.

31. Which of the choices, all true, would best support the claim made in the preceding sentence while remaining consistent with the focus of Paragraph 1?

A. NO CHANGE
B. If they are lucky, these actors can move from commercials to film.
C. But the fact remains that actors in television commercials work just as hard at their craft as do most movie actors.
D. Performers who act in commercials are generally paid more than most movie actors.

[2]

As a result, the competition for roles in commercials have been [32] fierce. A casting company will typically audition hundreds of people for one or two roles. Each role requires a certain physical type. So, while auditioning, performers tend to possess the same general physical characteristics. [33]

[3]

Although casting decisions are usually based on a performer's appearance, auditions are tension-filled and abrupt. Large groups of business types or athletic types or beach types assemble in a studio's lobby. After a seemingly endless wait, each performer takes a turn in front of the camera. Meanwhile, the [34] performer smiles, states his or her name, and then leaves the room. The entire screen test lasts about forty-five seconds!

[4]

Performers in Hollywood and New York compare commercial auditions to a day at the beach. [35]

The average performer is casting [36] in only a tiny

proportion of the commercials auditioning [37] for.

Although [38] performers are picked for one commercial a year, they're considered lucky.

32. **F.** NO CHANGE
G. were
H. are
J. is

33. **A.** NO CHANGE
B. Thus possessing the same physical characteristics, the performers tend to audition.
C. So, the performers who audition tend to possess the same general physical characteristics.
D. So, the same general physical characteristics tend to be in the possession of the performers who audition.

34. **F.** NO CHANGE
G. So, the
H. The
J. Nevertheless, the

35. Which of the choices most appropriately characterizes the nature of getting cast for a part as it is described in Paragraph 4?
A. NO CHANGE
B. lottery.
C. curse.
D. no-win situation.

36. **F.** NO CHANGE
G. is cast
H. cast
J. casts off

37. **A.** NO CHANGE
B. to audition
C. auditioned
D. auditions

38. **F.** NO CHANGE
G. Since
H. So
J. If

[5]

The frustrations of being a commercial actor are enormous. For the patient, persistent, and lucky performer, though,[39] the financial rewards more than compensate for the many disappointments. Performers are paid, roughly: $600[40] per day of shooting. However, the real money again[41] comes in the form of "residuals": performers are paid each time their commercial airs on television. More than $50,000 could be earned by a commercial if a performer runs for a year.[42] Not bad for two days' work! [43]

39. **A.** NO CHANGE
B. performer though
C. performer; though
D. performer, though;

40. **F.** NO CHANGE
G. paid roughly, $600,
H. paid roughly: $600
J. paid roughly $600

41. **A.** NO CHANGE
B. (Place before *performers*)
C. (Place before *each*)
D. (Place before *television*)

42. **F.** NO CHANGE
G. If the performer runs for a year, a commercial could earn more than $50,000.
H. If the commercial runs for a year, the performer could earn more than $50,000.
J. Commercials could earn more than $50,000 if the performer runs for a year.

43. Which of the following statements, if added here, would best reinforce for the reader the main point made in Paragraph 5?
A. Thus, for some actors in commercials, luck and perseverance can lead to impressive compensation.
B. But, it really isn't fair that only a few very lucky actors get to appear in commercials.
C. Therefore, the financial rewards for appearing in commercials are meager in comparison to the efforts of those who perform in the commercials.
D. Hence, commercial actors typically earn huge sums of money for working only two days.

Questions 44 and 45 ask about the preceding passage as a whole.

44. The writer is considering adding the following sentence to the essay:

> The resulting videotape is later sent to the product sponsor; it's the company that makes the final casting decision.

If added, this sentence would most logically be placed after the last sentence of Paragraph:
F. 2.
G. 3.
H. 4.
J. 5.

45. Suppose that the writer has been asked to write a brief essay illustrating some of the advantages and disadvantages of being an actor in television commercials. Does this essay successfully fulfill the assignment?
A. Yes; the essay describes the frustrations of auditions and the slim chances of getting work, but it also mentions the rewards that can go to patient and lucky actors.
B. Yes; the essay focuses on the grueling hours of training actors must undergo to audition for commercials, but it also explains that they get paid very well for their work.
C. No; the essay portrays the life actors live as easy, since they can work two days and earn $50,000 a year.
D. No; the essay focuses on the different types of actors that audition for parts, and on how frustrating those auditions are.

PASSAGE IV

Leading the Cherokee

According to Wilma P. Mankiller, whose job was 46 like running a large company. In 1993, she had a $78 million budget and 1,200 employees, and she answered to 140,000 people. What will she do next? 47 She was the elected principal chief of the Cherokee Nation in Oklahoma and the first woman in recorded history to lead a major North American Indian tribe.

In 1945, in Oklahoma, Mankiller (the name stems from a Cherokee military title) was born. 48 She spent her teen years and her early adulthood in San Francisco. In 1969, just outside the city, American Indian demonstrators occupied Alcatraz Island to protest the government's treatment of American Indians. The protesters didn't like the way the government was treating American Indians. 49 Listening to the activists, Mankiller realized that they were giving voice to feelings that she herself had. Mankiller began raising funds for the Alcatraz protestors and taking college courses in sociology. Several years later, she returned to Oklahoma with her two small daughters, determined to change her people's lives.

50 She led projects to build houses and to bring 51 running water to isolated towns. She

46. **F.** NO CHANGE
G. her job was
H. who's job was
J. the job being

47. **A.** NO CHANGE
B. What did she do?
C. Where will it all lead?
D. How does she do it?

48. **F.** NO CHANGE
G. Being in Oklahoma in 1945, Mankiller, the name stems from a Cherokee military title, was born.
H. Mankiller (the name stems from a Cherokee military title) was born in 1945 in Oklahoma.
J. Mankiller's name stems from a Cherokee military title, and in 1945 in Oklahoma, she was born.

49. **A.** NO CHANGE
B. They thought that the government was not treating American Indians fairly.
C. They were extremely upset with how the government treated American Indians.
D. OMIT the underlined portion.

50. Given that all are true, which of the following sentences, if added here, would most effectively introduce the new topic of this paragraph?
F. Mankiller focused on practical improvements in the rural, impoverished, fourteen-county region that makes up the Cherokee Nation.
G. Mankiller served as a role model to teenage girls by working hard for many years in order to help her people.
H. After San Francisco, this was the next logical step.
J. The Cherokee Nation that Mankiller returned to is located in northeastern Oklahoma.

51. **A.** NO CHANGE
B. bring about
C. bringing
D. OMIT the underlined portion.

seeked [52] start-up funding for the Cherokee Gardens being [53] a commercial gardening operation. Her success with economic development led to her election, in 1983, as deputy chief. [54] Four years later, Mankiller was elected principal chief. Still emphasizing self-help as a route in order to get more [55] self-esteem, her and her colleagues created [56] a Department of Commerce to coordinate future business development with the needs of existing enterprises. Mankiller also established programs that encourage [57] students to read and write Cherokee and to pass that knowledge to others.

The 1987 election was marred by controversy over whether a woman could hack it, [58] and Mankiller's margin of victory was slim. [59] However, in the 1991 election, in a tribute to her leadership skills and hard work, Mankiller won by a landslide.

52. **F.** NO CHANGE
G. sought
H. had seeked
J. seeks

53. **A.** NO CHANGE
B. Gardens that was
C. Gardens, it was
D. Gardens,

54. **F.** NO CHANGE
G. Leading to her election in 1983 as deputy chief, her success was with economic development.
H. Her election in 1983 as deputy chief was resulting from her economic success.
J. In 1983, electing her as deputy chief, her success with economic development was recognized.

55. **A.** NO CHANGE
B. to route
C. as a route to
D. as a way to gain and achieve more

56. **F.** NO CHANGE
G. Mankiller and her colleagues created
H. created by Mankiller and her colleagues was
J. Mankiller's colleagues and her created

57. **A.** NO CHANGE
B. encourages
C. was encouraging
D. does encourage

58. **F.** NO CHANGE
G. had what it took,
H. was fit to lead,
J. could call the shots,

59. The writer is considering adding the following sentence:

> Although the women's rights movement had helped many women in America gain upper-management positions in many companies, prejudices still existed.

Would this sentence be a relevant addition at this point in the essay, and why?

A. Yes, because it explains why Mankiller's margin of victory was so slim.
B. Yes, because it explains the comparison made at the beginning of the essay between Mankiller's job and running a large company.
C. No, because it contains information that detracts from the focus of this paragraph.
D. No, because it doesn't sufficiently explain how the women's rights movement helped professional women.

Question 60 asks about the preceding passage as a whole.

60. Suppose the writer had chosen to write a brief essay about the role of women in an American Indian tribe. Would this essay successfully fulfill the writer's goal?

- **F.** No, because the essay focuses on the life of one female American Indian leader and does not address the role of Cherokee women in general.
- **G.** No, because the essay indicates that most American Indian tribes are led by men.
- **H.** Yes, because the essay indicates that Mankiller had a difficult time getting elected at first because she was a woman.
- **J.** Yes, because Mankiller is portrayed in the essay as representative of many Cherokee women.

PASSAGE V

Living with Extremes

Whenever I tell friends about the ten years I lived in Fairbanks, Alaska, I find myself focusing not on the desolate wilderness beauty nor on the frigid arctic temperatures. But [61] on the drastic differences in daylight hours of summer and winter. On the shortest December days in Fairbanks, a pale sun lifts slightly above the southern horizon for less than five dusky hours. For [62] weeks in the summer, conversely, residents of Fairbanks bask in what seems like eternal sunshine, with the sun barely dipping below the northern horizon near midnight. Both the extremes of darkness and light and the constantly shifting day length effects [63] people in subtle and curious ways.

61.
- **A.** NO CHANGE
- **B.** temperatures but
- **C.** temperatures but,
- **D.** temperatures: but

62.
- **F.** NO CHANGE
- **G.** hours for
- **H.** hours, for
- **J.** hours: for

63.
- **A.** NO CHANGE
- **B.** affects
- **C.** effect
- **D.** affect

[64] Everything

has seemed[65] possible;

one[66] want to work or play all night. Some desperate

parents line their childrens bedroom window's[67] with aluminum foil to convince them that it is dark

outside, and not inside,[68] and time to go to bed. Other parents give up the clock altogether and take their

children to sunny[69] playgrounds in the middle of the night in June and July.

On the other hand,[70] summer days never seem to end, winter days never seem to begin. As the sun comes up later and later each winter morning, many people's initiation[71] lowers.

However, it[72] just doesn't seem fair that the day's duties should begin at eight or nine o'clock when the sun won't rise until ten or eleven. Depression often sets in and survival seem[73] doubtful as people go to work and come home in complete darkness. Many people find themselves wanting to do less and

64. Which of the following would best introduce the information in this paragraph?

F. Most people wish they could experience average days all the time.
G. Summer days have an endless quality.
H. Spring and fall aren't as odd as summer and winter.
J. Everybody should know what Alaska is like.

65. **A.** NO CHANGE
B. was
C. seems
D. seemed to be

66. **F.** NO CHANGE
G. everyone
H. people
J. they

67. **A.** NO CHANGE
B. children's bedroom windows
C. childrens' bedroom windows
D. childrens' bedroom windows'

68. **F.** NO CHANGE
G. outside the home
H. outside where they are
J. outside

69. Which of the choices would be most consistent with the essay and best suggest the reason for going to playgrounds in the middle of the night?

A. NO CHANGE
B. popular
C. nearby
D. unusual

70. **F.** NO CHANGE
G. Because
H. While
J. When

71. **A.** NO CHANGE
B. initiate
C. initiative
D. initiator

72. **F.** NO CHANGE
G. Nevertheless, it
H. Still, it
J. It

73. **A.** NO CHANGE
B. survival itself often seems
C. survival, it often seems
D. survival seeming

GO ON TO THE NEXT PAGE.

less each day—wanting, rather, to sleep through the winter like the hibernating bears.

Now having lived[74] in central Michigan where winter days are still considerably shorter than summer days, but the rate of change is much slower and the difference is less extreme. As the hours of sunlight decrease in December, many people comment on how dark it is by 5:00 P.M. These comments make me realize perceptions are relative: I think[75] Michigan winter days are rather long.

74. **F.** NO CHANGE
G. while I live
H. living
J. I live

75. **A.** NO CHANGE
B. relative I think
C. relative, I think,
D. relative; because I think

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

DO YOUR FIGURING HERE.

1. The lowest temperature on a winter morning was –8°F. Later that same day the temperature reached a high of 24°F. By how many degrees Fahrenheit did the temperature increase?

A. 3°
B. 8°
C. 16°
D. 24°
E. 32°

2. Disregarding sales tax, how much will you save when you buy an $11 compact disc that is on sale for 25% off?

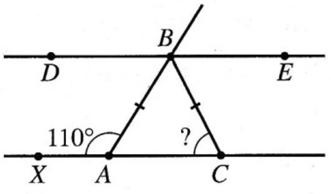
F. $0.28
G. $0.44
H. $2.75
J. $3.00
K. $8.25

3. As part of a school project, Akio wants to find the average cost of renting a newly released videotape from video rental stores in his neighborhood. He surveys 4 stores and finds the cost of renting a newly released videotape from the 4 stores to be $3.50, $3.40, $3.50, and $3.00, respectively. Using this data, what is the average cost of renting a newly released videotape from these 4 stores?

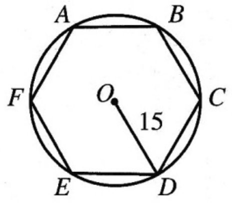
A. $3.25
B. $3.30
C. $3.35
D. $3.45
E. $3.50

4. In the figure below, $\overline{AC}$ is parallel to $\overline{DE}$ with X on $\overline{AC}$ and B on $\overline{DE}$. Also $\overline{AB} \cong \overline{BC}$, and the measure of $\angle XAB$ is 110°. What is the measure of $\angle ACB$?

F. 35°
G. 40°
H. 55°
J. 70°
K. 110°



5. Regular hexagon *ABCDEF* is inscribed in a circle, as shown below. If the length of radius $\overline{OD}$ is 15 centimeters, how long is $\overline{AB}$, in centimeters?

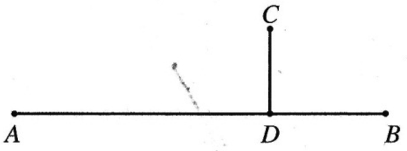


A. 15
B. 18
C. 30
D. 5π
E. $\frac{225\pi}{6}$

6. The price of a pumpkin is directly proportional to its weight. If a pumpkin that weighs 15.0 pounds costs \$3.25, how much will an 11.4-pound pumpkin cost?

F. \$0.95
G. \$1.23
H. \$1.95
J. \$2.47
K. \$4.28

7. In the figure below, *D* is a point on $\overline{AB}$, and $\overline{CD}$ is perpendicular to $\overline{AB}$. Based on this information, which of the following is the best conclusion?



A. $\angle CDA \cong \angle CDB$.
B. $\angle CDA$ is larger than $\angle CDB$.
C. $\overline{AB}$ bisects $\overline{CD}$.
D. $\overline{CD}$ and $\overline{DB}$ are equal in length.
E. Point *C* is equidistant from *A* and *B*.

8. If $3x - 7 = 4x - 16$, then $x = ?$

F. -23
G. -9
H. $-\frac{23}{7}$
J. $\frac{23}{7}$
K. 9

9. Which of the following is always equal to $a(5 - a) - 6(a + 4)$?

A. $-2a - 24$
B. $-2a + 4$
C. $-a^2 - a - 24$
D. $-a^2 - a + 4$
E. $-2a^3 - 24$

DO YOUR FIGURING HERE.

10. One marble is drawn at random from a bag containing 3 red, 2 blue, and 4 green marbles. What is the probability that the marble drawn is NOT blue?

F. $\frac{1}{2}$

G. $\frac{2}{9}$

H. $\frac{7}{9}$

J. $\frac{7}{24}$

K. $\frac{12}{81}$

11. Wanda programs her calculator to perform a linear function, but she doesn't tell you what that function is. When $n = 6$, the value of the function is 2. When $n = 12$, the value is 4. Which of the following expressions explains what the calculator will display when any number, n, is entered?

A. $\frac{n}{3}$

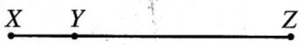
B. $n - 4$

C. $n - 8$

D. $2n - 10$

E. $2n - 20$

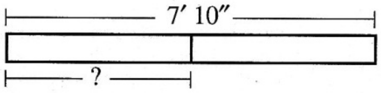
12. On the line segment below, the ratio of lengths XY to YZ is 1:3. What is the ratio of XY to XZ ?



F. 1:4
G. 1:2
H. 3:1
J. 4:1
K. Cannot be determined from the given information

13. If a board 7 feet 10 inches long is cut into 2 equal parts, as shown below, what will be the length, to the nearest inch, of each part?

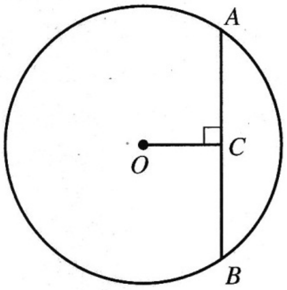
A. 3′ 5″
B. 3′ 9″
C. 3′ 11″
D. 4′ 2″
E. 4′ 5″



14. The speed of one train exceeds twice the speed of another by 30 mph. If r mph is the speed of the slower train, which of the following expresses the speed, in miles per hour, of the faster train?

F. $r + 15$
G. $r - 30$
H. $r + 30$
J. $2r - 30$
K. $2r + 30$

15. The circle shown below has a radius of 10 meters, and the length of chord $\overline{AB}$ is 16 meters. If O marks the center of the circle, what is the length of $\overline{OC}$?



A. $2\sqrt{3}$
B. 6
C. 12
D. $4\sqrt{21}$
E. 36

16. What is the value of the expression $x^3 - 2x^2 + 4x + 4$ for $x = -2$?

F. 12
G. -2
H. -4
J. -8
K. -20

17. What is the next term after $-\frac{1}{4}$ in the geometric sequence $16, -4, 1, -\frac{1}{4}, \cdots$?

A. $-\frac{1}{8}$
B. 0
C. $\frac{1}{16}$
D. $\frac{1}{8}$
E. $\frac{1}{2}$

18. On the blueprint for Betty's house, $\frac{1}{4}$ inch represents an actual length of 1 foot. What is the area, in square feet, of Betty's rectangular bedroom, which is $2\frac{1}{2}$ inches by 3 inches on the blueprint?

F. 30
G. 44
H. 60
J. 120
K. 244

19. If $a > 0$ and $b < 0$, then the sum of a and b:

A. is always positive.
B. is always negative.
C. is always zero.
D. cannot be zero, but can be any other real number.
E. can be any real number.

20. If $x + \frac{3}{4} = \frac{1}{28}$, then $x =$?

F. 21

G. $\frac{11}{14}$

H. $\frac{1}{21}$

J. $-\frac{1}{16}$

K. $-\frac{5}{7}$

DO YOUR FIGURING HERE.

21. What is the slope of the line given by the equation $3x + 5y = -15$?

A. -3

B. $-\frac{5}{3}$

C. $-\frac{3}{5}$

D. 3

E. 5

22. The length of a side of a square is represented as $(2x - 3)$ inches. Which of the following general expressions represents the area of the square, in square inches?

F. $4x^2 - 12x + 9$
G. $4x^2 - 12x + 6$
H. $4x^2 - 6x + 9$
J. $4x^2 - 9$
K. $8x - 12$

23. Which of the following is a polynomial factor of $x^2 - 2x - 15$?

A. $15 - x$
B. $5 + x$
C. $3 + x$
D. $2 - x$
E. x

24. In the equation $m = \frac{3}{1+q}$, q represents a positive integer. As q gets larger and larger without bound, the value of m:

F. gets closer and closer to 0.
G. gets closer and closer to 1.
H. gets closer and closer to 3.
J. remains constant.
K. gets larger and larger.

DO YOUR FIGURING HERE.

25. The book *Fahrenheit 451* by Ray Bradbury is about a society in which all books are banned and burned. The title of the book gives the approximate temperature at which paper starts to burn. Since Fahrenheit, F, and Celsius, C, temperatures are related by the formula $C = \frac{5}{9}(F - 32)$, which of the following would make an equivalent title for the book?

A. *Celsius 219*
B. *Celsius 233*
C. *Celsius 268*
D. *Celsius 754*
E. *Celsius 844*

26. The length of a rectangle is 6 inches longer than the width. If the perimeter of the rectangle is 48 inches, what is the width, in inches?

F. 8
G. 9
H. 15
J. 21
K. 27

27. What are all the solutions for x if $2x^2 - 3x - 20 = 0$?

A. $x = -20$ only

B. $x = -5$ or $x = 2$

C. $x = -4$ or $x = \frac{5}{2}$

D. $x = -\frac{5}{2}$ or $x = 4$

E. $x = -2$ or $x = 5$

28. In Terell's history class, all tests count equally. So far, Terell has taken 2 of the 3 tests in history and earned scores of 93% and 82%, respectively. What is the minimum percent Terell needs on the third test to have a test average of at least 85% ?

F. 89%
G. 88%
H. 87%
J. 83%
K. 80%

29. If a, b, and c are positive integers such that $a^b = x$ and $c^b = y$, then $xy = ?$

A. ac^b
B. ac^{2b}
C. $(ac)^b$
D. $(ac)^{2b}$
E. $(ac)^{b^2}$

30. What is the area, in square inches, of a circle with a diameter equal to 10 inches?

F. 100
G. 25
H. 10π
J. 25π
K. 100π

31. To get a driver's license, an applicant must pass a written test and a driving test. Past records show that 80% of the applicants pass the written test and 60% of those who have passed the written test pass the driving test. Based on these figures, how many applicants in a random group of 1,000 applicants would you expect to get driver's licenses?

A. 200
B. 480
C. 600
D. 750
E. 800

32. If $\sin A = \frac{4}{5}$, then which of the following could be $\tan A$?

F. $\frac{1}{4}$
G. $\frac{3}{4}$
H. 1
J. $\frac{4}{3}$
K. 4

33. If x is any number other than 4 and 5, then $\frac{(4-x)(x-5)}{(x-4)(x-5)} = ?$

A. -20
B. -1
C. 0
D. 1
E. 20

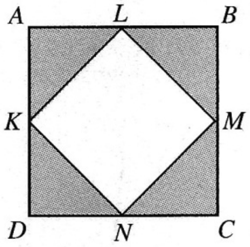
34. $\sqrt{50} + \sqrt{128} = ?$

F. $13\sqrt{2}$
G. $14\sqrt{2}$
H. $2\sqrt{5} + 2\sqrt{8}$
J. $89\sqrt{2}$
K. $\sqrt{178}$

35. Triangle $\triangle ABC$ is similar to $\triangle DEF$. $\overline{AB}$ is 8 inches long, $\overline{BC}$ is 10 inches long, and $\overline{AC}$ is 16 inches long. If the longest side of $\triangle DEF$ is 40 inches long, what is the perimeter, in inches, of $\triangle DEF$?

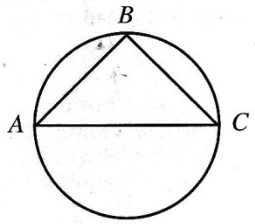
A. 74
B. 85
C. 90
D. 136
E. 170

36. Sides $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{DA}$ of square $ABCD$ have midpoints L, M, N, and K, as shown below. If $\overline{AB}$ is 6 inches long, what is the area, in square inches, of the shaded region?



F. $4\frac{1}{2}$
G. $6\sqrt{2}$
H. 9
J. $12\sqrt{2}$
K. 18

37. In the figure below, $\overline{AC}$ is a diameter of the circle, B is a point on the circle, and $\overline{AB} \cong \overline{BC}$. What is the degree measure of $\angle ABC$?



A. 45°
B. 60°
C. 75°
D. 90°
E. Cannot be determined from the given information

38. In the standard (x,y) coordinate plane, what are the coordinates of the midpoint of a line segment with endpoints $(-1,3)$ and $(2,7)$?

F. $\left(\frac{1}{2},5\right)$
G. $\left(1,\frac{9}{2}\right)$
H. $\left(\frac{3}{2},2\right)$
J. $(1,4)$
K. $(3,4)$

DO YOUR FIGURING HERE.

39. In a downhill ski race, Margo posted a time of 2 minutes and 24 seconds for a course 1.2 miles long. About how many miles per hour did she average for the race?

A. 60
B. 30
C. 20
D. 3
E. 2

40. For the 2 functions $f(x)$ and $g(x)$, tables of values are shown below. What is the value of $g(f(3))$?

x	$f(x)$
−5	7
−2	−5
1	3
3	2

x	$g(x)$
−2	3
1	−1
2	−3
3	−5

F. −5
G. −3
H. −1
J. 2
K. 7

41. For positive real numbers x, y, and z, which of the following expressions is equivalent to $x^{\frac{1}{2}}y^{\frac{2}{3}}z^{\frac{5}{6}}$?

A. $\sqrt[3]{xy^2z^3}$

B. $\sqrt[6]{xy^2z^5}$

C. $\sqrt[6]{x^3y^2z^5}$

D. $\sqrt[6]{x^3y^4z^5}$

E. $\sqrt[11]{xy^2z^5}$

42. A formula for the area of a rhombus is $A = \frac{1}{2}d_1d_2$, where d_1 and d_2 are the lengths of the diagonals. Which of the following is an expression for d_2 ?

F. $\frac{2A}{d_1}$

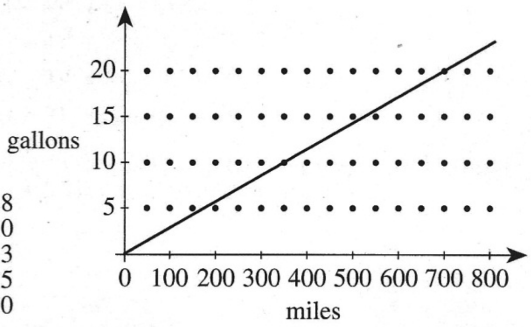
G. $\frac{A}{2d_1}$

H. $\frac{Ad_1}{2}$

J. $2(A - d_1)$

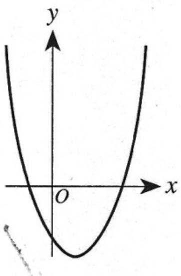
K. $A - \frac{d_1}{2}$

43. The line graphed below shows the predicted gasoline use for a certain car. Which of the following is the closest estimate of this car's predicted *rate* of gasoline use, in miles per gallon?



A. 28
B. 30
C. 33
D. 35
E. 40

44. The graph of $y = ax^2 + bx + c$ in the standard (x,y) coordinate plane is shown below.



When $y = 0$, which of the following best describes the solution set for x ?

F. 2 real solutions
G. 1 double real solution only
H. 1 real and 1 imaginary solution
J. 1 double imaginary solution only
K. 2 imaginary solutions

45. If $|y| = y + 6$, then $y = $?

A. -12
B. -6
C. -3
D. 0
E. 6

46. What fraction lies exactly halfway between $\frac{2}{3}$ and $\frac{3}{4}$?

F. $\frac{3}{5}$
G. $\frac{5}{6}$
H. $\frac{7}{12}$
J. $\frac{9}{16}$
K. $\frac{17}{24}$

DO YOUR FIGURING HERE.

47. Elliott writes a check for $15. He records the check in his check register, which up to this time has shown the correct balance. When figuring his new balance, he accidentally *adds* $15 instead of subtracting. The balance in his check register now shows:

A. $30 less than it should.
B. $15 less than it should.
C. the correct amount.
D. $15 more than it should.
E. $30 more than it should.

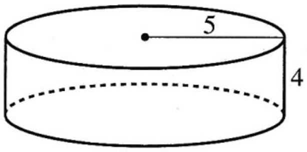
48. Six plants, each of a different plant type, are to be arranged on a display shelf's 6 spots. If each spot must have a plant, in how many different arrangements can the plants be placed?

F. 6
G. 21
H. 30
J. 36
K. 720

49. In the standard (x,y) coordinate plane, what is the distance between the points $(3,-4)$ and $(-5,2)$?

A. 4
B. 6
C. 8
D. 10
E. 14

50. A formula for the volume, V, of a right circular cylinder is $V = \pi r^2 h$, where r is the radius and h is the height. The cylindrical tank shown below has radius 5 meters and height 4 meters and is filled with water.



If 1 cubic meter of water weighs approximately 2,205 pounds, then the weight, in pounds, of the water in the tank is:

F. less than 200,000.
G. between 200,000 and 400,000.
H. between 400,000 and 600,000.
J. between 600,000 and 800,000.
K. more than 800,000.

51. What are the values of θ, between 0° and 360°, when $\tan \theta = -1$?

A. 225° and 315° only
B. 135° and 315° only
C. 135° and 225° only
D. 45° and 135° only
E. 45°, 135°, 225°, and 315°

GO ON TO THE NEXT PAGE.

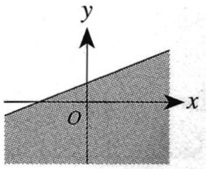
DO YOUR FIGURING HERE.

52. Which of the following is an equation of a circle with its center at (3,4) and tangent to the x-axis in the standard (x,y) coordinate plane?

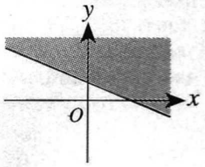
F. $(x-3)^2 + (y-4)^2 = 16$
G. $(x-4)^2 + (y-3)^2 = 16$
H. $(x-4)^2 + (y-3)^2 = 9$
J. $(x-3)^2 + (y-4)^2 = 9$
K. $(x+4)^2 + (y+3)^2 = 16$

53. Which of the following best represents the graph of $y \le ax + b$ for some positive a and negative b ?

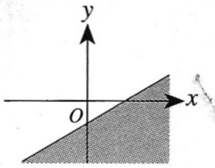
A.



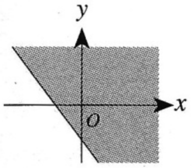
B.



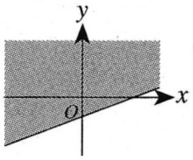
C.



D.

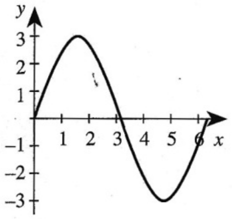


E.

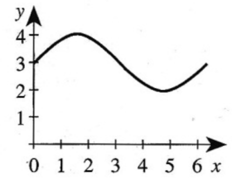


54. One of the graphs below is that of $y = A \sin\theta$ for θ between 0 and 6.28 radians, where A is a constant. Which graph?

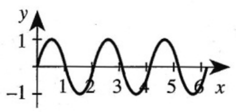
F.



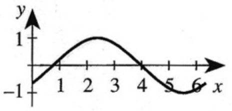
G.



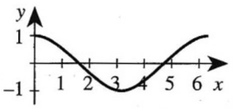
H.



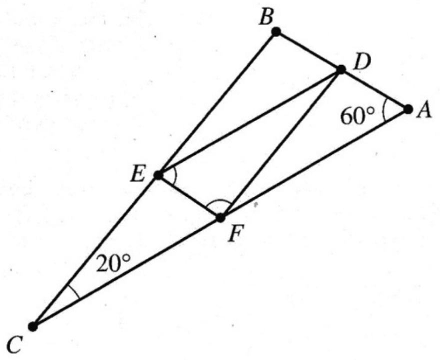
J.



K.



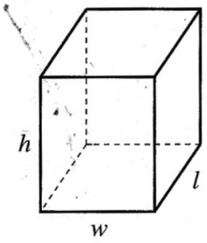
55. In the figure below, D, E, and F are the midpoints of the sides $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$, respectively. If the measure of $\angle BCA$ is 20°, and the measure of $\angle BAC$ is 60°, what is the sum of the measures of $\angle DFE$ and $\angle FED$?



A. 60°
B. 80°
C. 100°
D. 120°
E. 160°

DO YOUR FIGURING HERE.

56. A formula for the surface area (A) of the rectangular solid shown below is $A = 2lw + 2lh + 2wh$ where l represents length; w, width; and h, height. By doubling each of the dimensions (l, w, and h), the surface area will be multiplied by what factor?



F. 2
G. 4
H. 6
J. 8
K. 12

57. If $\sin x = \frac{\sqrt{3}}{2}$ and $\cos x = -\frac{1}{2}$, then $\sec x = ?$

A. -2

B. $-\sqrt{3}$

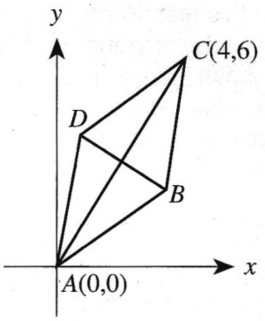
C. $-\frac{2}{\sqrt{3}}$

D. $\frac{2}{\sqrt{3}}$

E. 2

DO YOUR FIGURING HERE.

58. In a rhombus, all 4 sides are the same length. Rhombus *ABCD* below has vertices at *A*(0,0) and *C*(4,6). What is the slope of diagonal $\overline{BD}$?



F. $-\frac{3}{2}$

G. $-\frac{2}{3}$

H. $\frac{2}{3}$

J. $\frac{3}{2}$

K. Cannot be determined from the given information

59. Yvette earned a score of 56 on a recent 25-question multiple-choice exam. The scoring for the exam was +6 for each correct answer, –2 for each incorrect answer, and 0 for each unanswered question. What is the *maximum* number of questions Yvette could have answered correctly?

A. 9
B. 10
C. 11
D. 13
E. 14

60. In the standard (*x*,*y*) coordinate plane, the graphs of the 3 equations $x - 1 = 0$, $y + 2 = 0$, and $x + y = 4$ form the boundary of a triangle. What is the area of this triangle, expressed in square coordinate units?

F. $\frac{1}{2}$

G. $\frac{9}{2}$

H. 8

J. $\frac{25}{2}$

K. $\frac{49}{2}$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

DIRECTIONS: There are four passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

PROSE FICTION: This passage is adapted from "A New England Nun," a short story by Mary Wilkins Freeman (©1979 by The New American Library, Inc.).

Louisa was slow and still in her movements; it took her a long time to prepare her tea; but when ready it was set forth with as much grace as if she had been a veritable guest to her own self. The little square table stood exactly in the centre of the kitchen, and was covered with a starched linen cloth whose border pattern of flowers glistened. Louisa had a damask napkin on her tea-tray, where were arranged a cut-glass tumbler full of teaspoons, a silver cream-pitcher, a china sugar-bowl, and one pink china cup and saucer. Louisa used china every day—something which none of her neighbors did. They whispered about it among themselves. Their daily tables were laid with common crockery, their sets of best china stayed in the parlor closet, and Louisa Ellis was no richer nor better bred than they. Still she would use the china. She had for her supper a glass dish full of sugared currants, a plate of little cakes, and one of light white biscuits. Also a leaf or two of lettuce, which she cut up daintily. Louisa was very fond of lettuce, which she raised to perfection in her little garden. She ate quite heartily, though in a delicate, pecking way; it seemed almost surprising that any considerable bulk of the food should vanish.

After tea she filled a plate with nicely baked thin corn-cakes, and carried them out into the back-yard.

"Caesar!" she called. "Caesar! Caesar!"

There was a little rush, and the clank of a chain, and a large yellow-and-white dog appeared at the door of his tiny hut, which was half hidden among the tall grasses and flowers. Louisa patted him and gave him the corn-cakes. Then she returned to the house and washed the tea-things, polishing the china carefully. . . . Louisa took off her green gingham apron, disclosing a shorter one of pink and white print. She lighted her lamp, and sat down again with her sewing.

In about half an hour Joe Dagget came. She heard his heavy step on the walk, and rose and took off her pink-and-white apron. Under that was still another—white linen with a little cambric edging on the bottom; that was Louisa's company apron. She never wore it without her calico sewing apron over it unless she had a guest. She had barely folded the pink and white one with methodical haste and laid it in a table-drawer when the door opened and Joe Dagget entered.

He seemed to fill up the whole room. A little yellow canary that had been asleep in his green cage at the south window woke up and fluttered wildly, beating his little yellow wings against the wires. He always did so when Joe Dagget came into the room. . . .

She placed a chair for him, and they sat facing each other, with the table between them. He sat bolt-upright, toeing out his heavy feet squarely, glancing with a good-humored uneasiness around the room. She sat gently erect, folding her slender hands in her white-linen lap.

"Been a pleasant day," remarked Dagget.

"Real pleasant," Louisa assented, softly. "Have you been haying?" she asked, after a little while.

"Yes. . . . Pretty hot work.". . .

Presently Dagget began fingering the books on the table. There was a square red autograph album, and a Young Lady's Gift-Book which had belonged to Louisa's mother. He took them up one after the other and opened them; then laid them down again, the album on the Gift-Book.

Louisa kept eyeing them with mild uneasiness. Finally she rose and changed the position of the books, putting the album underneath. That was the way they had been arranged in the first place.

Dagget gave an awkward little laugh. "Now what difference did it make which book was on top?" said he.

Louisa looked at him with a deprecating smile. "I always keep them that way," murmured she.

"You do beat everything," said Dagget, trying to laugh again. His large face was flushed.

He remained about an hour longer, then rose to take leave. Going out, he stumbled over a rug, and trying to recover himself, hit Louisa's work-basket on the table, and knocked it on the floor.

He looked at Louisa, then at the rolling spools; he ducked himself awkwardly toward them, but she stopped him. "Never mind," said she; "I'll pick them up after you're gone.". . .

Louisa got a dust-pan and brush, and swept Joe Dagget's track carefully.

If he could have known it, it would have increased his perplexity and uneasiness, although it would not have disturbed his loyalty in the least. . . .

They were to be married in a month, after a singular courtship which had lasted for a matter of fifteen years. For fourteen out of the fifteen years the two had not once seen each other, and they had seldom exchanged letters.

1. The first paragraph suggests that Louisa's neighbors consider her to be:

A. a close friend.
B. someone to be emulated.
C. a bit odd and stuck up.
D. a rich eccentric.

2. It is reasonable to infer from the passage that Joe trips on Louisa's rug because he is:

I. usually reckless and careless.
II. always clumsy and weak.
III. feeling uneasy at the moment.

F. I only
G. III only
H. I and II only
J. II and III only

3. The evidence in the passage most strongly supports an inference that when he is at Louisa's house Joe primarily feels:

A. uncomfortable.
B. amused.
C. happy.
D. annoyed.

4. It is reasonable to conclude from the sequence of events narrated in the passage that Louisa tells Joe she'll pick up the spools after he leaves because she:

F. wants to reassure him that the mess is unimportant to her.
G. is trying to get him to pay more attention to her.
H. blames herself for leaving the work-basket where it could be knocked over.
J. fears that if he does it, he'll only create more disorder.

5. The phrase "a veritable guest to her own self" (lines 3–4) most strongly suggests that Louisa:

A. pretends that she has visitors.
B. wishes she had company.
C. treats herself well.
D. is self-effacing and ill-at-ease in her own home.

6. The passage suggests that Louisa often wears more than one apron at a time because she is:

F. forgetful.
G. modest.
H. methodical.
J. hypochondriacal.

7. Which of the following phrases best describes the way Louisa eats supper when she is alone?

A. Quickly and heartily
B. Daintily and with little appetite
C. Slowly and without pleasure
D. Meticulously but heartily

8. Given the evidence in the passage, which of the following statements describe(s) the way Joe feels about Louisa?

I. He doesn't want to marry her.
II. He enjoys relaxing in her tidy home.
III. He is puzzled by her.

F. II only
G. III only
H. I and III only
J. II and III only

9. The description in the passage suggests that Joe seems "to fill up the whole room" (line 45) because:

A. Louisa is timid and ill-at-ease.
B. he is out of place.
C. he is aggressive and domineering.
D. he fills the room with his chatter.

10. Which of the following conclusions about Louisa's neighbors does the passage justify?

I. They dislike people who do things differently than they do.
II. They think Louisa is putting on airs.
III. They think Louisa is richer than they are.

F. I only
G. III only
H. I and II only
J. I and III only

GO ON TO THE NEXT PAGE.

Passage II

SOCIAL SCIENCE: This passage is adapted from an article by David Ferman, "Too Much of a Good Thing," which appeared in the magazine *Adbusters Quarterly* (©1991 by Adbusters Media Foundation).

Kermit the Frog should be proud. At long last North America is learning what the famous amphibian has lamented for years: It's not easy being green.

The greening of our society has surpassed the media trend phase, and has taken root in our culture as a permanent imperative, an ongoing reality that will affect every facet of our society.

When even corporate America takes (at least the rhetoric of) environmentalism to heart we can be confident that the movement has been firmly entrenched. When a corporate juggernaut like Procter & Gamble flies executives to a Victoria, B.C., city council meeting to beg that their disposable diapers not be banned from local landfills; and then offers to donate $100,000 in seed money to the city's composting program, we can be certain that green will be around as long as greenbacks.

But a disturbing pattern has developed within the movement as it grows. The pattern goes like this: scientists forecast a specific cataclysm (ozone depletion, global warming, rampant deforestation); the mass media disseminates the information (inevitably oversimplifying things); public reacts with shock and demands answers; the media redoes the story with household tips to prevent said cataclysm; corporate sector and finally government present "friendly" (band-aid) programs to slow down the inevitable; media drops the subject; public relaxes; scientists announce a new calamity . . . and the merry jig goes on.

There are many drawbacks to this sort of feedback loop, not the least being that each successive crisis brings us closer to a jaded, "quit crying wolf" attitude. Our problem lies in the nature of reaction itself. Because environmental problems are so often presented in an air of crisis, we lose the opportunity to calmly examine the source of the problems. When we do explore the reasons behind ecological threats, we delve no further than learning that, say, fluorocarbons from aerosols deplete upper atmosphere ozone. Rarely, if ever, do we face the fact that all these impending natural disasters stem from the same man-made source. All our specific little solutions make us miss the point of the problem as a whole. Virtuous consumption, bringing home CFC-free deodorant spray in a biodegradable plastic bag, diverts our attention from the true source of our environmental woes—*consumption itself.*

Our culture's highest aim, some would argue our only aim, is to grow, to consume. Industrial and commercial growth are the measures of our nation's strength. Our work ethic has been so twisted and mutated that even language reflects that our dearest wish for ourselves is to grow, to be *productive,* and to *consume.*

This has not always been the case. As social critic Stuart Ewen recently noted, "Up until the 17th century, 'consumption' had a negative connotation, essentially it's about destruction." Later, during the 17th and 18th centuries, consumption gained a neutral sense in describing the new marketplace economics. By the 20th century consumerism and consumption were being exalted.

"To be a consumer is what we are," says Ewen. "Consumption is the ideal we seek. Unfortunately, it is still what it meant before the 17th century. A consumption-based economy is an economy driven by waste . . . and therefore constant buying and disposing of goods starts clouding the environment, starts destroying the ozone layer, starts filling the waters that sustain us with garbage . . . making life on earth impossible. Then we have to realize that consumption as a way of life has to be thrown into question."

But when our ancestors prayed and worked for growth and productivity they didn't have material gain as their only aim. Growth could also be gained in spiritual, educational and other realms. Somehow, somewhere, we lost sight of what success means and fashioned in its place a glorious, shining future where bigger is better, new is good, and old is to be replaced as quickly as possible. I don't think our forefathers and mothers would be satisfied with our fifty varieties of cereal, our traffic jams, our undisposable nuclear waste, and our landfills full of disposable diapers. Impressed? Yes. Horrified? Maybe. Satisfied? I doubt it. Even without knowing of the ecological drawbacks, they would probably say we are making pigs of ourselves: wasting far more than we use; and using much, much more than we need.

11. According to the passage, today's society judges our nation's strength by which of the following criteria?

A. A stringent work ethic
B. Individual political freedom
C. Neutral marketplace economies
D. Industrial and commercial growth

12. The passage suggests that environmentally conscious behaviors like using biodegradable plastic bags and CFC-free deodorant:

F. cannot change the face of American business practice.
G. are necessary only if we want to have a productive economy.
H. are superficial solutions to a much larger problem.
J. will eventually solve all our environmental problems.

13. The passage indicates that one cause of the thinning of the ozone layer is:

A. the burning of disposable diapers.
B. the release of fluorocarbon gases.
C. overflowing landfills throughout the U.S.
D. CFC-free deodorant spray.

14. The author indicates that he feels consumption as it is practiced in our society to be:

F. materialistic.
G. efficient.
H. imminent.
J. destructive.

15. As it is used in line 62, the word *exalted* most nearly means:

A. criticized.
B. ignored.
C. satisfied.
D. glorified.

16. As it is used in line 32, the phrase "quit crying wolf" most nearly means that:

F. after repeated environmental crises, the public grows doubtful of their seriousness.
G. environmentalists must stop complaining about mass media's inadequate coverage.
H. the public no longer believes corporate America's promises to clean up the environment.
J. the media has begun to challenge scientists' claims that each environmental problem is a serious crisis.

17. The author states that society doesn't get a chance to calmly examine the source of environmental problems because:

A. most people lack the necessary expertise to determine solutions.
B. the problems are frequently presented in an air of crisis.
C. most people are too intimidated to confront big business and the government.
D. the environmental movement has not yet been firmly established in the U.S.

18. The author of the passage claims that when the mass media ceases to cover an environmental story:

F. the public grows outraged and uneasy.
G. scientists attempt to find another calamity.
H. the public assumes the crisis has passed.
J. the government offers band-aid programs.

19. The passage indicates that today's society differs from that of our ancestors in that:

A. our ancestors were more critical of society.
B. our ancestors exalted consumerism.
C. today's society has a broader view of success.
D. today's society has a narrower view of success.

20. The passage indicates that the word *consumption* changed from a negative word to a positive word as:

F. American society's definition of success became limited to economic growth.
G. American culture became less materialistic.
H. American society made gains materially, educationally, and spiritually.
J. the greening of our society became entrenched.

GO ON TO THE NEXT PAGE.

Passage III

HUMANITIES: This passage is adapted from Audreen Buffalo's article "Sweet Honey: A Cappella Activists," which appeared in *Ms.* magazine (©1993 by Lang Communications, Inc.).

In 1973, Bernice Johnson Reagon, vocal director of the D.C. Black Repertory Theater, was urged by members of the Washington, D.C.-based company to organize a singing group. Sweet Honey in the Rock was the happy result. Using the original instrument—the human voice—aided only by *shekere*, tambourine, and microphone, the ensemble has built a reputation as the world's premier female a cappella ensemble [a group that sings without musical instruments accompanying it].

In helping birth Sweet Honey, Reagon brought sure knowledge of music's informational and transformative power to the task. Her musical mission is rooted in the rural southern church pastored by her father. "For the first 11 years, our church had no piano, and I'm still an a cappella singer. I grew up singing in the nineteenth-century congregational tradition—a style that can be traced to Africa."

In describing that tradition Reagon says: "Spontaneity is one of the characteristics that mark congregational singing. Singers create as they go along. Although a leader introduces the song, there is no solo tradition. Once the song is raised, the group joins and the creation becomes collaborative. You must be open to what will happen to the song and you in performance."

Reagon's life continues to be informed by the Georgia community into which she was born and her early civil rights activism with the Student Nonviolent Coordinating Committee (SNCC). She, Rutha Mae Harris, Cordell Reagon, and Charles Neblett were members of the SNCC Freedom Singers. Appearing at hundreds of freedom rallies and mass meetings during the early 1960s, they were the movement's singing newspaper—reporting and defining the actions and issues from the civil rights war zones where they were frequently arrested. In many ways her mission has not changed.

Spirituality, consciousness-raising, social responsibility, healing, and—most of all—love resonate at the heart of Sweet Honey's repertoire. Songs such as "Patchwork Quilt," "Are My Hands Clean?" and the Grammy-nominated "Emergency," address AIDS, worker and environmental exploitation, and racism.

The first song Reagon taught the group was one she'd never sung but remembered from her youth, "Sweet Honey in the Rock." "When I asked my father about its meaning, he said it was a parable that referred to a land where, when rocks were cracked, honey would flow from them." Reagon came to interpret this as a metaphor for the legacy of African American women in the United States. Within many African traditions rocks are considered living spirits. "So too, sometimes, we, black women, have had to have the standing power of rocks and of mountains—cold and hard, strong and stationary. That quality has often obscured the fact that inside the strength, partnering the sturdiness, we are as honey. If our world is warm, honey flows and so do we. If it is cold, stiff, and stays put—so do we."

Reagon, Ysaye Maria Barnwell, Nitanju Bolade Casel, Shirley Childress Johnson, Aisha Kahlil, and Carol Maillard are the women who currently compose the musical collective. Over the years more than 20 singers have been members of the group.

The group meets, in the ancient way of women, communally. Each is aware of the others' unique contributions. Each serves as a master teacher in at least one repertoire or singing style and apprentices in an area covered by another member. They write, produce, discuss points of view, and develop ideas for songs and treatments.

The fluid communal spirit of the group is manifest in every performance.

"People who respond so enthusiastically to Sweet Honey hear their own inner echo. They hear their names called, their thoughts confirmed," says Reagon.

"After a Sweet Honey performance, people often ask, 'Why do I feel so good after hearing songs that deal with issues I usually find paralyzing to think about?'

"Life's challenges are not supposed to paralyze you, they're supposed to help you discover who you are. They're the prod that moves you forward.

"The civil rights movement was the most wonderful thing I experienced in my life," Reagon muses. "Day by day, I found courage to be who I was. Finding courage. Taking the risk. There was something about doing things that I had always been warned would kill or ruin you. Well, I did get suspended and I did go to jail—things I had been told to avoid at all costs. But I found that if you avoided everything that was a risk, there would be many things you'd never know about yourself."

21. Reagon indicates that her experience in the civil rights movement made her more:

A. resentful.
B. serious.
C. confident.
D. social.

22. Reagon's remarks in lines 74–76 most strongly indicate that:

F. the audience appreciates the variety of talents in the group.
G. people in the audience learn new ideas from the group.
H. the group encourages the audience to participate in their songs.
J. people in the audience relate to the group's message.

23. The passage suggests that Reagon began singing a cappella because:

A. it was the style of the SNCC Freedom Singers.
B. the D.C. Black Repertory Theater wanted her to.
C. there were no musical instruments in her church.
D. she wanted to honor African traditions.

24. It may be reasonably inferred from the eighth paragraph (lines 65–71) that the way the members of Sweet Honey in the Rock work together is designed to encourage:

F. cooperation and mutual respect.
G. musical progress through competition.
H. esteem for leadership and hierarchy.
J. political awareness and activism.

25. The author of the passage states that the group's communal meetings are based on a custom established by:

A. civil rights activists.
B. African Americans.
C. musicians.
D. women.

26. It may be reasonably inferred from the passage that the author considers Reagon's "sure knowledge" (line 12) to be a product of Reagon's experience:

F. singing in church and as a member of the SNCC Freedom Singers.
G. studying civil rights issues in school in the early 1960s.
H. learning first how to produce inspirational music with musical instruments.
J. building the world's premier female a cappella ensemble.

27. It may be reasonably inferred that the author's main purpose in writing this passage was to describe:

A. the accomplishments of Bernice Johnson Reagon and how she has influenced the group Sweet Honey in the Rock.
B. how the group Sweet Honey in the Rock worked hard to become the world's premier female a cappella ensemble.
C. how female artists, such as those in Sweet Honey in the Rock, often have a difficult time becoming successful.
D. the effect the civil rights movement had on Bernice Johnson Reagon, both personally and professionally.

28. In the third paragraph (lines 19–26), Reagon most strongly suggests that congregational singing requires singers to be:

F. methodical.
G. determined.
H. adaptable.
J. inspirational.

29. One of the main points Reagon makes in her comments in lines 53–59 is that:

A. the most admirable people are those who can be strong and stationary.
B. the best way for people to learn about themselves is to have the standing power of rocks.
C. people should make every effort to hide their inner feelings so that they are not vulnerable to others.
D. what people seem like on the outside isn't necessarily what they are like on the inside.

30. The passage indicates that, through the years, Sweet Honey in the Rock has changed significantly in terms of its:

F. mission.
G. members.
H. singing style.
J. intended audience.

Passage IV

NATURAL SCIENCE: This passage is adapted from Richard Monastersky's article "Deep-See Shrimp," which was published in *Science News* magazine (©1989 by Science Service, Inc.).

The term "jumbo shrimp" has always tickled oxymoron-lovers. But scientists are chuckling at a new morsel of shrimp humor—the name *Rimicaris exoculata.*

In 1985, when researchers discovered these shrimp swarming around deep-sea geysers of super-heated water, they named the species *exoculata,* meaning "without eyes." It seemed a fair and accurate title for a shrimp that lacked the eyestalks and corneas other shrimp use for vision.

But marine biologist Cindy Van Dover from the Woods Hole Oceanographic Institution and her colleagues report that the eyeless *R. exoculata* does indeed have eyes. For some reason, the forces of evolution have granted this shrimp a pair of unusual visual organs located on the animal's back.

The story of *R. exoculata*'s eyes began in 1986 when Van Dover obtained some specimens of the shrimp in order to study their diet.

While studying the contents of the shrimps' stomachs, Van Dover began to focus on a strange patch located on the backs of the animals. This patch was hardly noticeable on the dead specimens that had been fixed in preservatives or frozen for lab study. But in videotapes of the live animals in their natural habitat, taken from the deep submersible *Alvin,* the patches were reflective. The submarine's lights glinted off them as car headlights might set a cat's eyes aglow.

When Van Dover took a closer look at one of the specimens, she saw that the reflective patches seen on video were actually two lobe-shaped structures sitting underneath a thin, transparent layer of carapace, or shell-type material. A dissection showed that these lobes hooked into the shrimp's brain via a bundle of neurons that looked suspiciously like an optic nerve. She wondered: Could this be an eye?

She asked biochemist Ete Z. Szuts at Marine Biological Laboratory in Woods Hole to look for characteristic visual molecules in the lobes. Meanwhile, bioengineer Steven C. Chamberlain, a specialist in the structure of invertebrate eyes from Syracuse University, examined the back organ to determine whether it was actually organized like eyes.

Chamberlain was able to detail the anatomy of the patch, but he could not pin down the function of this novel structure. "I wasn't willing to say it was a sensory organ; it could have been a gland," he says. Ultimately, it would be up to Szuts' lab to provide the key piece of proof that the organ must be a pair of eyes.

Szuts was looking for a visual pigment known as rhodopsin, which is the light-sensing molecule in all known types of eyes. Rhodopsin molecules are the switchboard in the eye, absorbing photons of visible light and initiating a neurologic message to the brain.

At the start, Szuts did not expect to find any rhodopsin when he ground up several of the organs for analysis. An animal's back just seemed to be the wrong place to put a pair of eyes. After all, he thought, other species of deep-sea shrimp have eyes in the normal place.

Besides, even if the back patch turned out to be two visual organs, other problems would seem to hinder the detection of any pigment. Normally, biochemists need concentrated extracts from some 50 to 100 shrimp in order to detect any visual pigment molecules, says Szuts. But the number of available *R. exoculata* was limited, and he was dealing with extracts from 5 to 10 shrimp.

Szuts' skepticism turned to surprise when he found the "eyeless" shrimp did have rhodopsin. "It turns out *R. exoculata* has a visual pigment, and it has it in very large quantities—at the very least five times more than the usual amount of pigment in other shrimp," he says. Because the bright lights of the submersible most likely damaged much of the pigment in the collected shrimp, Szuts believes the pigment he found must be only a small fraction of the amount the animal truly possesses.

It doesn't take a microscope to see some of *R. exoculata*'s adaptations for sensing extremely weak light. Perhaps the most striking feature about the eyes is their size. Chamberlain believes they developed on the animal's back because that is the only spot where such large organs would fit.

R. exoculata's eyes have no lenses, so they cannot see actual images of an object. Just about all they can do is sense the strength and direction of a light source. Yet while they seem limited by the standards of animals living in bright light, the strange eyes are particularly well adapted for their dark environment.

31. As it is used in line 46, the word *novel* most nearly means:

A. unfamiliar.
B. book-like.
C. typical.
D. inadequate.

32. If *R. exoculata*'s patch functioned as a gland, rather than as an eye, which of the following observations would a researcher reasonably expect to find?

F. The patch would not be lobe-shaped.
G. *R. exoculata* would have eyestalks on its front.
H. The patch would not contain rhodopsin.
J. *R. exoculata* would have a larger optic nerve.

33. Which of the following statements most accurately characterizes the primary significance of Szuts's research findings?

A. Szuts proved that the reflective patches of *R. exoculata* contain much more visual pigment than do the eyes of most shrimp.
B. Szuts created the possibility that the reflective patches of *R. exoculata* were glands rather than sensory organs.
C. Szuts proved that the reflective patches of *R. exoculata* were adaptations for living near underwater geysers.
D. Szuts demonstrated that the reflective patches of *R. exoculata* were anatomically organized like most shrimp's eyes.

34. The passage indicates that Van Dover originally began studying *R. exoculata* because she wanted to:

F. prove that they had eyes.
G. examine their reflective patches.
H. study their natural habitat.
J. study their eating habits.

35. It may be reasonably inferred that the videotape taken from the deep submersible *Alvin* was essential in the discovery of *R. exoculata*'s eyes primarily because it:

A. allowed Van Dover to see the shrimp in their natural habitat.
B. alerted Van Dover to the existence of the reflective patches.
C. provided Van Dover with a clear picture of the two lobe-shaped structures.
D. supplied Van Dover with an illustration of how these shrimp use their unique vision.

36. It may be reasonably inferred from the passage that the message initiated by rhodopsin is transmitted to the brain through:

F. carapace.
G. reflective patches.
H. the optic nerve.
J. eyestalks.

37. According to the passage, what effect, if any, did the limited number of available *R. exoculata* have on the outcome of Szuts's experiment?

A. It prevented him from determining conclusively that the patches were sensory organs.
B. It hindered the detection of the presence of visual pigments.
C. It had no effect, because each shrimp contained large amounts of visual pigment.
D. It had no effect, because the patches from the shrimp he used had not been damaged.

38. The passage suggests that, in his research of *R. exoculata,* Chamberlain was unable to determine:

F. how many visual organs the patch contained.
G. whether the patch functioned as an eye.
H. whether the patch contained lenses.
J. how the anatomy of the patch was organized.

39. The main idea of lines 55–68 is that:

A. biochemists normally need concentrated extracts from 50 to 100 shrimp.
B. for a variety of reasons, Szuts believed it unlikely that he would detect rhodopsin in the patches.
C. to prove that the back patch functioned as an eye, Szuts had to find eyestalks.
D. it seemed illogical to Szuts that eyes could be located on a shrimp's back.

40. It may be reasonably inferred from the passage that the term "characteristic visual molecules" in line 39 refers to:

F. eyestalks.
G. rhodopsin.
H. corneas.
J. reflective patches.

END OF TEST 3

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO A PREVIOUS TEST.

SCIENCE TEST

35 Minutes—40 Questions

DIRECTIONS: There are seven passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

Passage I

Students debate 4 hypotheses regarding the Moon's origin, based on the following observations.

Observations

Observation 1 – Earth and the Moon have the same proportions of various oxygen *isotopes* (forms of oxygen).

Observation 2 – The same minerals that compose terrestrial lavas are also found in lunar lava specimens.

Observation 3 – The Moon contains little or no water.

Observation 4 – Earth contains a much higher percentage of iron than does the Moon.

Observation 5 – Fossil records show that the length of Earth's day used to be shorter.

Observation 6 – Collisions between Mars and other objects have resulted in the ejection of material from Mars's surface. Some of the ejected material has reached Earth.

Hypothesis 1

All of the material that formed the Moon came from Earth. The rate of Earth's spin on its axis was high enough at one time to eject material from Earth's surface. This material was unable to escape Earth's gravity and went into orbit around Earth, forming the Moon.

Hypothesis 2

The material that composes the Moon came mostly from Earth's surface. A large object from another part of the solar system collided with Earth and threw the surface material into orbit around Earth. Some of the differences in composition between Earth and the Moon might be accounted for by the composition of matter from the large object.

Hypothesis 3

The Moon was never a part of Earth, because Earth's and the Moon's chemical compositions have too few similarities. The Moon and Earth probably formed within the same cloud of gas and dust, when large clumps of gas and dust in the cloud gravitationally attracted additional materials from the cloud. (The collapse of clouds of gas and dust also results in the formation of stars.)

Hypothesis 4

The Moon most likely came from somewhere in the solar system far from Earth. As the Moon approached Earth, it was attracted more strongly by Earth's gravitational field. Although the Moon speeded up as it approached Earth, it was not moving fast enough as it passed Earth to escape Earth's gravity. Consequently, it entered into orbit around Earth.

1. According to Hypothesis 2, the origin of most of the matter composing the Moon was most likely which of the following objects?

A. A star far from the Sun
B. Earth
C. Mars
D. The Sun

2. Supporters of Hypothesis 1 would most likely agree that at the time the Moon formed, the rotation rate of Earth on its axis was:

F. fewer than 1 rotation per year.
G. 100 rotations per year.
H. 365 rotations per year.
J. many more than 365 rotations per year.

3. Suppose that supporters of Hypothesis 2 suggested that the Moon contained a significant amount of water when it was first formed. Which of the following statements about the Moon's water content would be most consistent with their suggestion?

A. The Moon's water content decreased after the Moon was formed.
B. The Moon's water content increased rapidly after the Moon was formed.
C. The Moon's water content increased slowly after the Moon was formed.
D. The Moon's water content was constant after the Moon was formed.

4. Hypothesis 3 includes the assertion that Earth and the Moon probably formed from the same cloud of gas and dust, most likely to explain which of the following pairs of observations?

F. Observations 1 and 2
G. Observations 2 and 3
H. Observations 2 and 4
J. Observations 3 and 4

5. The 4 hypotheses discuss 4 possible mechanisms for the Moon's formation. The 4 mechanisms all depend the most on which of the following influences?

A. Gravity
B. Earth's rotation
C. The Moon's rotation
D. Volcanic action

6. Consider the oxygen isotopes ^{16}O and ^{18}O. If, on Earth, the ratio of ^{16}O to ^{18}O is approximately 500:1, based on the information in Observations 1–6 the ratio of these isotopes on the Moon would most likely be:

F. 1:1.
G. 50:1.
H. 100:1.
J. 500:1.

7. Which of the following assumptions regarding the Moon's origin is implicit in Hypothesis 1 ?

A. The Moon is older than Earth.
B. The Moon is younger than Earth.
C. The Moon still has active volcanoes.
D. The Moon's surface composition is identical to that of Earth's core.

Passage II

Large cities have their own climate that differs from the climate in adjacent suburban and rural areas. A scientist performed the following studies to learn more about an urban climate.

Study 1

Air temperatures, in degrees Celsius (°C), were recorded hourly over a 24-hour period at 3 sites: the center of a large city (the urban site), an adjacent suburban site, and a nearby rural site. This was done on 30 consecutive days during summer and 30 consecutive days during winter. Each hourly temperature was averaged over the given season. The results are in Figure 1.

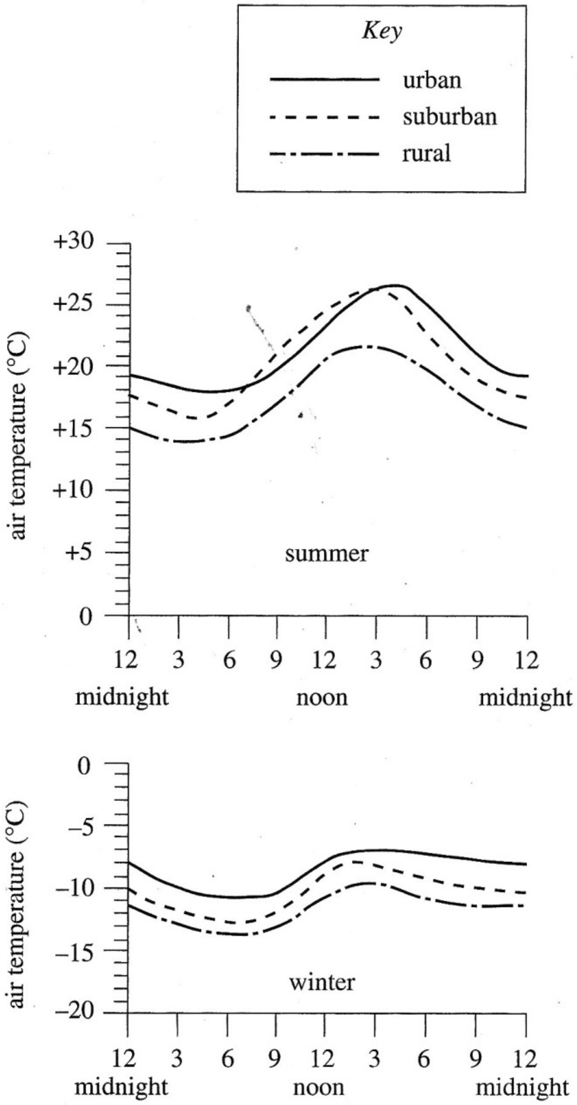


Figure 1

Study 2

A site in the city was selected where a large concrete parking lot was located next to a large grassy area. After the parking lot and grassy area had been exposed to full sunlight for 8 hours, air temperature readings were taken at the surface every 20 meters (m) across the concrete and grass, starting at the center of the parking lot. The results are in Figure 2.

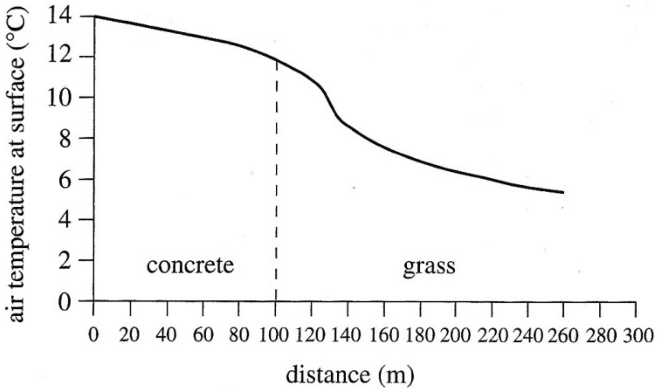


Figure 2

Study 3

Weather instruments were used to measure the wind velocity on 30 days at various altitudes above the 3 sites used in Study 1. The wind velocities, in kilometers per hour (km/hr), were used to generate the wind profiles shown in Figure 3.

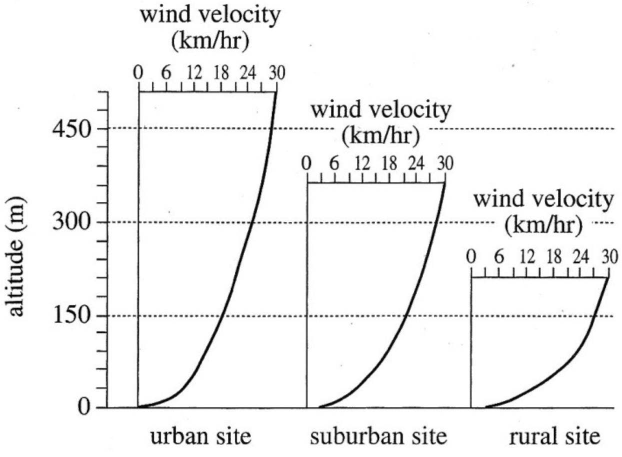


Figure 3

Figures adapted from W. M. Marsh, *Earthscape: A Physical Geography.* ©1987 by John Wiley and Sons, Inc.

Study 4

The scientist kept track of the amount of cloud cover and precipitation daily for 3 years in the city and the rural area. It was found that the city had 10% more cloudy or hazy days and 10% more precipitation than the rural area. Air quality measurements revealed that the city air contained 10 times more dust particles than rural air.

8. According to Study 1, during which of the following time periods does the suburban site always have a higher temperature than the urban site on a summer day?

F. Between 3 A.M. and 9 A.M.
G. Between 5 A.M. and 9 A.M.
H. Between 8 A.M. and 2 P.M.
J. Between 12 noon and 6 P.M.

9. It is known that water vapor needs solid "nuclei" for it to condense into water droplets and form clouds. According to Study 4, which of the following is the best explanation why the urban area had 10% more rain than the rural area?

A. Wind velocity is much higher in the city than at the rural site.
B. The urban area has more dust particles that become nuclei for water droplets.
C. Fewer clouds form over urban areas compared to rural sites.
D. Only dust particles can be nuclei for water vapor condensation.

10. Based on the results of Study 3, which of the following generalizations could be made about wind velocities in the 3 study areas?

F. Urban areas have the highest wind velocity at altitudes below 150 m.
G. Suburban areas have the highest wind velocity at altitudes below 150 m.
H. Rural areas have the highest wind velocity at altitudes below 150 m.
J. Urban areas have the same wind velocity as suburban areas at any given altitude.

11. If Study 1 produced results typical of any rural site, which of the following generalizations could be made about seasonal climates?

A. The temperature range at a rural site throughout a typical day is smaller during the winter than during summer.
B. The temperature range at a rural site throughout a typical day is larger during the winter than during summer.
C. The maximum temperature at a rural site throughout a typical winter day is the same as that at an urban site.
D. The maximum temperature at a rural site throughout a typical winter day is the same as that at a suburban site.

12. According to Study 1, the temperature difference between the urban and the rural sites at 6 P.M. on a typical winter day is approximately:

F. 1°C.
G. 4°C.
H. 7°C.
J. 10°C.

13. According to Study 3, wind velocity in urban areas increases:

A. more rapidly with altitude than wind velocity in suburban areas.
B. at the same rate with altitude as wind velocity in suburban areas.
C. at the same rate with altitude as wind velocity in rural areas.
D. more slowly with altitude than wind velocity in rural areas.

Passage III

A chemist performed 3 experiments to determine the boiling points and freezing points of purified water (H_2O) and solutions of various types of solids dissolved in H_2O.

Experiment 1

Fifty milliliters (mL) of H_2O was heated in a beaker. The temperature of the H_2O was recorded every 2 minutes (min) until it remained constant, indicating the boiling point. The procedure was repeated with a solution of 5 grams (g) of sodium chloride (NaCl) in 50 mL of H_2O and with 10 g of NaCl in 50 mL of H_2O. The results are shown in Figure 1.

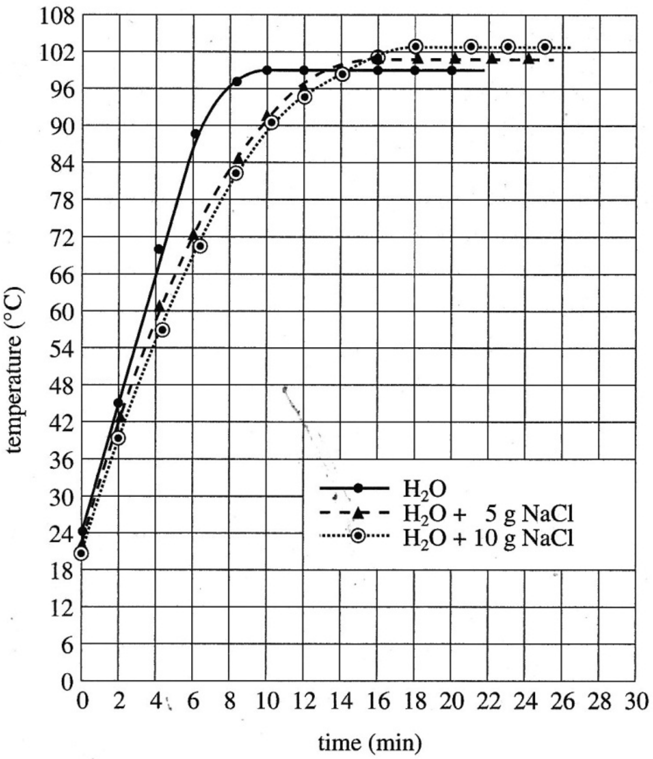


Figure 1

Figure adapted from M. Lesser, C. Constant, and J. Weisler, *Contemporary Science – Book 3*. ©1978 by Amsco School Publications, Inc.

Experiment 2

A beaker containing 50 mL of H_2O was placed in a *dry ice bath* (an insulated bowl of solid CO_2, which produces temperatures below –70°C). When the H_2O began to solidify, the temperature was recorded. The procedure was repeated with various amounts of NaCl added to 50 mL of H_2O. The percentages of NaCl by mass, the masses of NaCl, and the freezing points are shown in Table 1.

Table 1

Solution	% NaCl	Mass of NaCl (g)	Freezing point (°C)
1	0	0.0	0.00
2	3	1.5	–1.85
3	6	3.0	–3.63
4	9	5.0	–5.77
5	13	7.5	–9.03
6	17	10.0	–12.30

Experiment 3

The freezing points of various solutions of potassium chloride (KCl) and calcium chloride ($CaCl_2$) were measured using the same method as in Experiment 2. The results are shown in Tables 2 and 3.

Table 2

Solution	% KCl	Mass of KCl (g)	Freezing point (°C)
7	3	1.5	–1.48
8	6	3.0	–2.80
9	9	5.0	–4.30
10	13	7.5	–6.45
11	17	10.0	N.M.*

* Not measured

Table 3

Solution	% $CaCl_2$	Mass of $CaCl_2$ (g)	Freezing point (°C)
12	3	1.5	–1.47
13	6	3.0	–2.93
14	9	5.0	–5.04
15	13	7.5	–8.72
16	17	10.0	–13.65

14. Which of the following factors was constant throughout all of the experiments?

F. The amount of H_2O
G. The amount of solid dissolved
H. The type of solid dissolved
J. The weight percent of solid dissolved

15. If, in Experiment 3, the chemist had measured the freezing point of Solution 11, the value would most likely be closest to:

A. 0°C.
B. −10°C.
C. −14°C.
D. −17°C.

16. Based on the results of Experiments 2 and 3, the freezing point is influenced by which of the following factors?

F. The type of solid dissolved only
G. The amount of solid dissolved only
H. Both the type and amount of solid dissolved
J. The amount of dry ice used in the dry ice bath

17. Based on the results of Experiment 3, a 7.5% solution of $CaCl_2$ in H_2O would have a freezing point closest to:

A. −2.93°C.
B. −4.01°C.
C. −5.04°C.
D. −8.72°C.

18. Which of the following assumptions did the chemist make about the dry ice used in Experiments 2 and 3 ?

F. Dry ice dissolves in H_2O to form a solution of CO_2 and the added solid.
G. Dry ice does not dissolve in H_2O.
H. The temperature of dry ice is less than the freezing points of the solutions.
J. The temperature of the dry ice is greater than the freezing points of the solutions.

19. Which of the following procedures would most likely raise the freezing point of all of the solutions measured in Experiment 3 ?

A. Adding 1 g of NaCl to the solution
B. Adding 1 g of $CaCl_2$ to the solution
C. Adding 10 mL of H_2O to the solution
D. Adding 1 g of NaCl and 1 mL of H_2O to the solution

Passage IV

A scientist tested the ability of 4 drugs to kill cancer cells.

Experiment 1

Permeability coefficients measure a drug's ability to enter a cell. The larger the permeability coefficient, the faster the drug enters a cell. The molecular mass, in atomic mass units (amu), and permeability coefficient, in centimeters per second (cm/sec), of the 4 drugs at 37°C were measured and are shown in Table 1.

Table 1

Drug	Molecular mass (amu)	Permeability coefficient (cm/sec)
A	485	10^{-5}
B	500	10^{-6}
C	515	10^{-7}
D	530	10^{-8}

Experiment 2

Equal numbers of cancer cells were put into flasks containing 5.0 mL of nutrient medium. The cells were incubated for 1 hour at 37°C with 1 of the 4 drugs shown in Table 2. A control consisted of cells incubated in medium without any drugs. The cells were washed to remove residual drug traces and grown on nutrient plates for 7 days. During this time, the cells reproduced, forming colonies which were then counted. Plates with more colonies were assumed to have more live cells at the end of the 1-hour incubation. Table 2 shows the number of colonies counted. The drug-free control showed 30 colonies.

Table 2

Drug	Drug concentration (μM)*			
	1	5	10	25
A	22	11	4	0
B	26	21	10	1
C	28	23	11	2
D	30	25	12	3

*μM is micromolar
Note: Numbers of colonies are averages for 3 *replicates* (identical samples).

Experiment 3

Cells were handled as described in Experiment 2 with two exceptions: all drugs were tested at the same concentration and incubation time was varied. Table 3 shows the number of colonies counted for Experiment 3.

Table 3

Drug	Incubation time (hours)			
	1	6	12	24
A	12	4	1	0
B	21	8	3	1
C	23	10	5	2
D	25	12	6	3
None	30	30	30	30

Note: Numbers of colonies are averages for 5 replicates.

20. If Experiment 3 were repeated with Drug C and an incubation time of 3 hours, the number of colonies counted would most likely be:

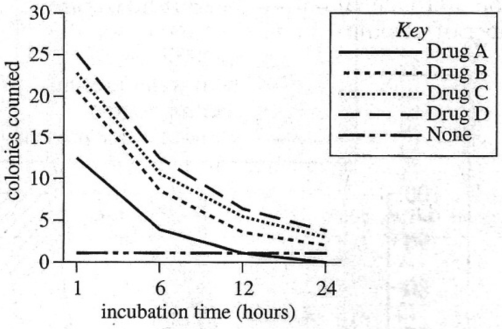
F. less than 11.
G. between 11 and 22.
H. between 23 and 30.
J. greater than 30.

21. Based on the results of Experiment 1, which drug enters cells most quickly?

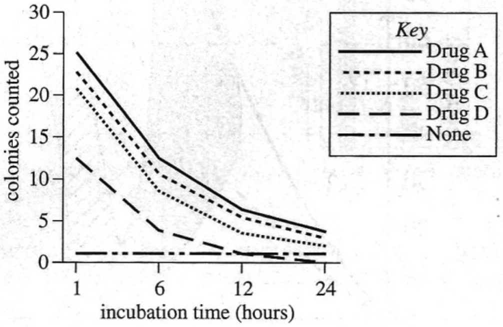
A. Drug A
B. Drug B
C. Drug C
D. Drug D

22. Which of the following graphs best shows the relationship between incubation time and colonies counted in Experiment 3 ?

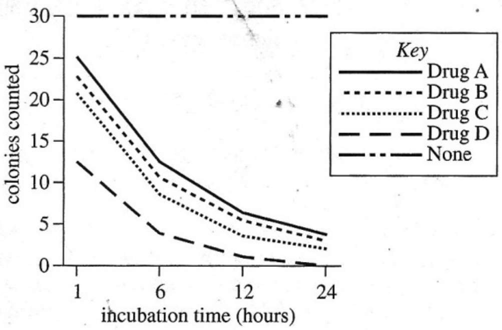
F.



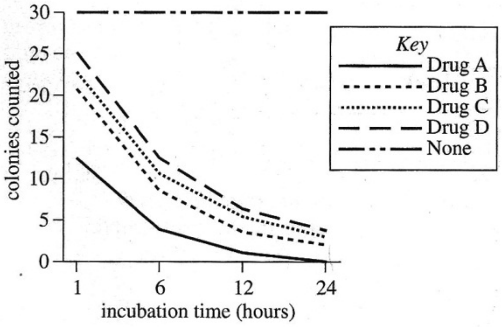
G.



H.



J.



23. Which of the following statements best describes the relationship between the molecular mass and the permeability coefficient of the drugs, as shown in Experiment 1 ?

A. As the molecular mass increases, the permeability coefficient increases.
B. As the molecular mass increases, the permeability coefficient decreases.
C. As the molecular mass decreases, the permeability coefficient decreases.
D. As the molecular mass decreases, the permeability coefficient remains constant.

24. The experimental procedures used in Experiments 2 and 3 differed in that in Experiment 2:

F. incubation time was held constant, while drug concentration was varied.
G. incubation time was varied, while drug concentration was held constant.
H. incubation time and drug concentration were both varied.
J. incubation time and drug concentration were both held constant.

25. In Experiment 2, what was the relationship between drug concentration and the drug's effectiveness in killing cancer cells?

A. All 4 drugs were most effective at the highest concentration used.
B. All 4 drugs were most effective at the lowest concentration used.
C. Some of the drugs were most effective at the lowest concentration used while others were most effective at the highest concentration used.
D. Based on Experiment 2, there is no relationship between drug concentration and effectiveness.

Passage V

Heat flow is the escape of Earth's interior heat through the *lithosphere* (crust and upper mantle combined). For a given thickness, high heat flow indicates a rapid temperature increase with depth. Figure 1 is a cross-sectional view of oceanic and continental lithospheres.

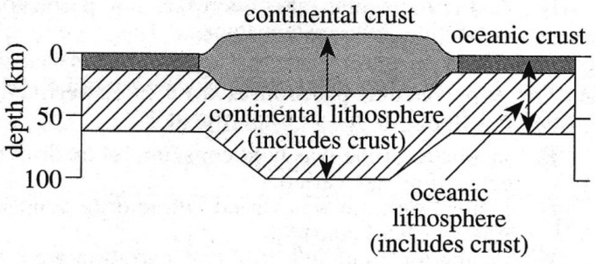

continental crust
oceanic crust
depth (km)
0
50
100
continental lithosphere (includes crust)
oceanic lithosphere (includes crust)

Figure 1

Figure 2 shows heat flow, in watts per square meter (W/m^2), for parts of the oceanic lithosphere and the average heat flows for both lithosphere types.

Figure 3 shows the average relationship between temperature and depth for both lithosphere types. The shaded areas are where lithosphere material would melt with and without water.

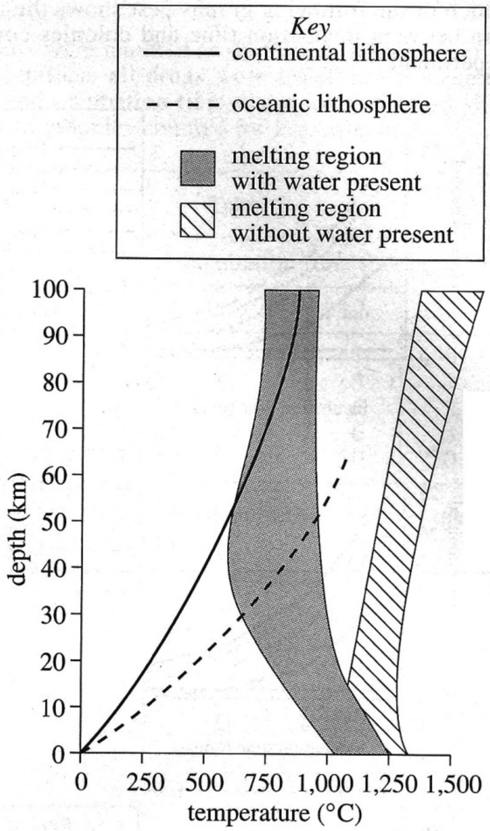


Figure 3

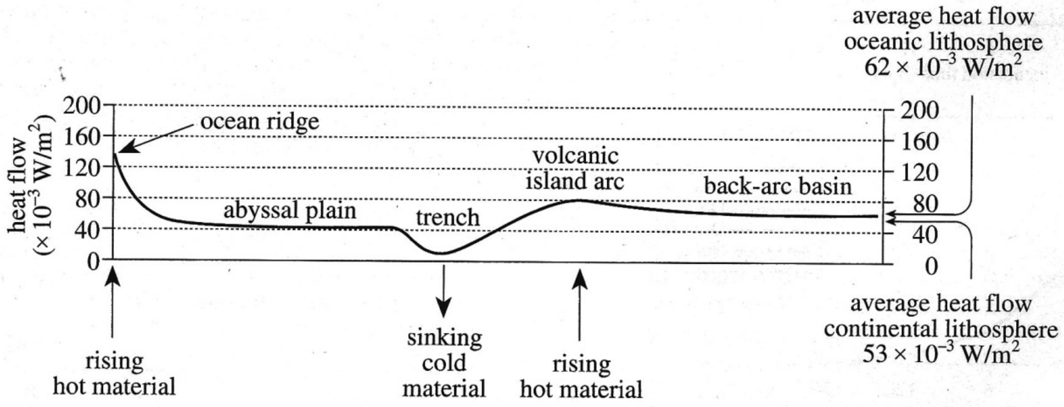
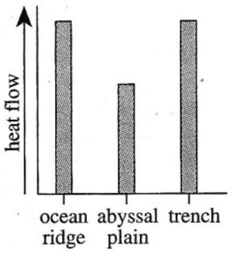
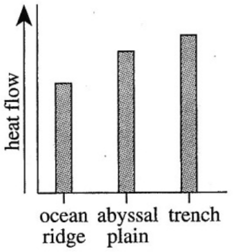


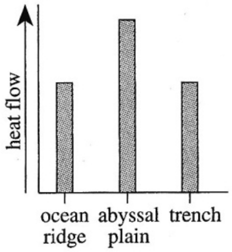
Figure 2

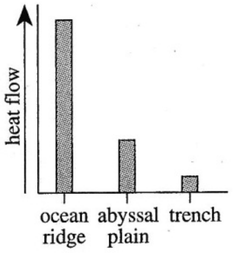
Figures adapted from Frank Press and Raymond Siever, *Earth*. ©1986 by W. H. Freeman and Co.

26. According to Figure 2, which of the following graphs best represents the heat flows from an ocean ridge, an abyssal plain, and a trench?

F.


H.


G.


J.


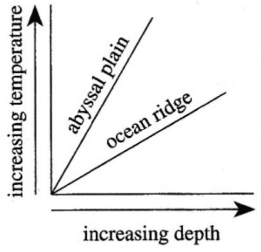
27. According to Figure 2, compared to other heat flow values, the heat flow measured from a back-arc basin is:

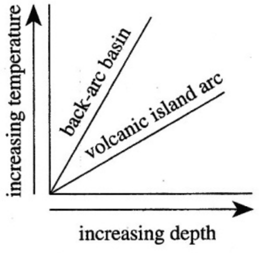
A. much higher than the heat flow from an ocean ridge.
B. approximately the same as the heat flow from a trench.
C. approximately the same as the heat flow from an ocean ridge.
D. approximately the same as the average heat flow for the oceanic lithosphere.

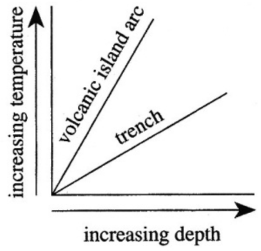
28. Some of the highest heat flows are found over *hydrothermal vents* on the seafloor, where steam and hot water rise out of Earth. According to Figure 2, hydrothermal vents are most likely found in:

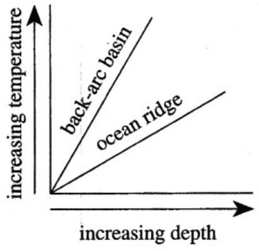
F. ocean ridges.
G. continental mountain ranges.
H. abyssal plains.
J. trenches.

29. If scientists measured how temperature changes with depth in different parts of the oceanic lithosphere, according to Figure 2, which of the following sets of temperature-depth plots would you predict?

A.


C.


B.


D.


30. According to Figure 3, when comparing the properties of the continental lithosphere to those of the oceanic lithosphere, one would state that the continental lithosphere is:

F. the same temperature as the oceanic lithosphere at any depth.
G. hotter than the oceanic lithosphere at any given depth beneath 10 km.
H. cooler than the oceanic lithosphere at any given depth beneath 10 km.
J. thinner than the oceanic lithosphere.

Passage VI

Scientists established 5 artificial marine ecosystems (A–E) to study the interactions of oil spills and organisms. Table 1 shows what was added to each ecosystem.

Table 1

	Ecosystem				
	A	B	C	D	E
Oil*		✓	✓	✓	✓
Bacteria			✓	✓	
Phosphate fertilizer				✓	✓
Lugworms	✓	✓	✓	✓	✓
Flounders (fish)	✓	✓	✓	✓	✓

*Oil was added at a concentration of 400 parts per million (ppm).

The oil, bacteria, fertilizer, lugworms, and flounders were added in early March. Figure 1 shows how the concentration of oil in Ecosystems B, C, D, and E, and the number of bacteria/mL in Ecosystems C and D changed over 16 months.

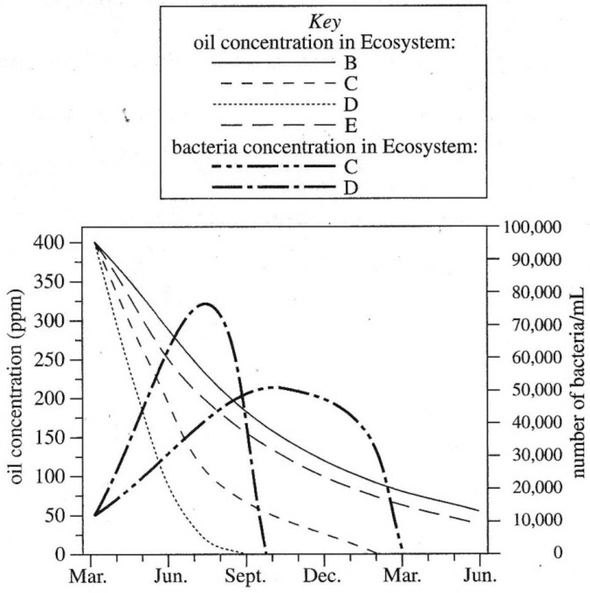


Figure 1

Figure 2 shows how the number of lugworms/m^2 changed over 16 months in each ecosystem.

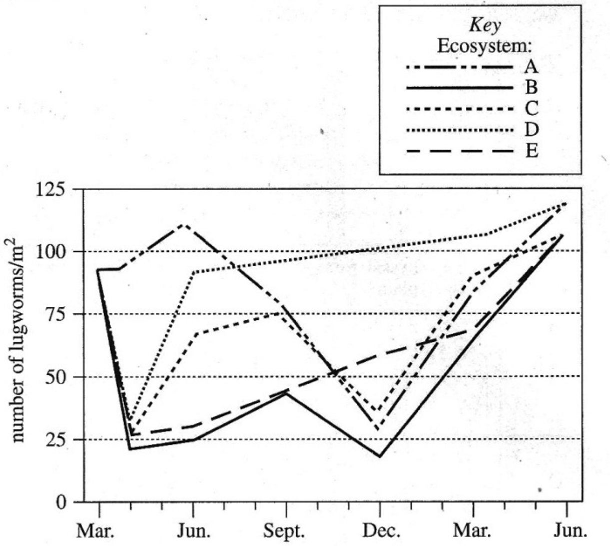


Figure 2

Figure 3 shows how the biomass of flounders in kilograms/1,000 m^3 of water changed over 16 months in each ecosystem.

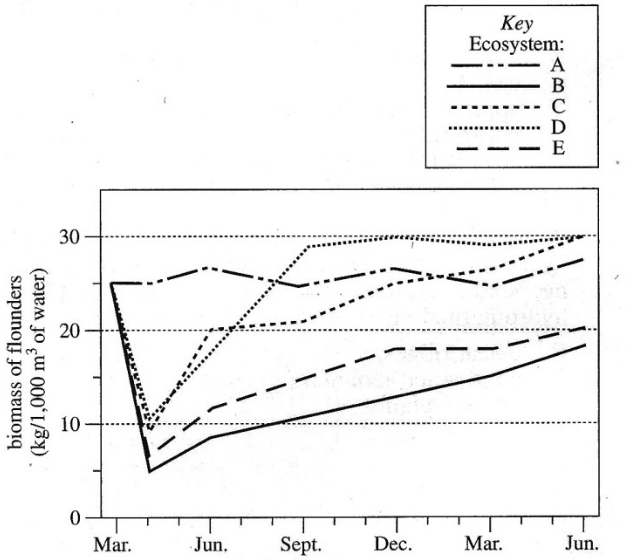


Figure 3

31. According to Figure 1, the oil concentration decreased most rapidly in which ecosystem?

A. Ecosystem B
B. Ecosystem C
C. Ecosystem D
D. Ecosystem E

32. Which of the following reasons best explains why the biomass of the flounders was determined rather than their numbers?

F. Flounders can live longer than 16 months.
G. Flounders do not survive in the presence of oil.
H. A polluted environment may affect the growth of flounders without killing them.
J. It is easier to count flounders than to weigh them.

33. Which of the following conclusions about the effect of oil on flounders in the months following the first month of exposure to oil is supported by Figures 1 and 3 ?

A. As the concentration of oil increased, the biomass of the flounders increased then decreased.
B. As the concentration of oil decreased, the biomass of the flounders decreased.
C. As the concentration of oil decreased, the biomass of the flounders increased.
D. The concentration of oil does not appear to affect flounder biomass.

34. An oil tanker accidentally spilled oil into a marine ecosystem. According to Figures 1–3, one would advise the cleanup crew to add which of the following to the oil spill to best speed cleanup?

F. Lugworms only
G. The phosphate fertilizer only
H. Lugworms and flounders only
J. The bacteria and phosphate fertilizer only

35. Which of the following pieces of evidence best supports the conclusion that the bacteria added to the ecosystems could only feed on oil?

A. The oil concentration decreased more slowly when bacteria were present.
B. The bacterial populations decreased to zero soon after the oil concentration was zero.
C. The size of the bacterial populations was greatest when the concentration of oil was greatest.
D. Flounder biomass increased even in the presence of bacteria.

Passage VII

According to a simplified model of the hydrogen atom, an *electron* orbits a *proton* located at the center of the atom. The electron can exist only in certain orbits, each with a specific radius. When the electron jumps from one orbit to another orbit of smaller radius, the atom emits a packet of energy known as a *photon.*

The electron jumps shown in Figure 1, which involve the first 6 orbits, result in the emission of 3 types of photons—ultraviolet, visible, and infrared. The energies and *wavelengths* of the photons emitted due to these jumps are shown in Table 1.

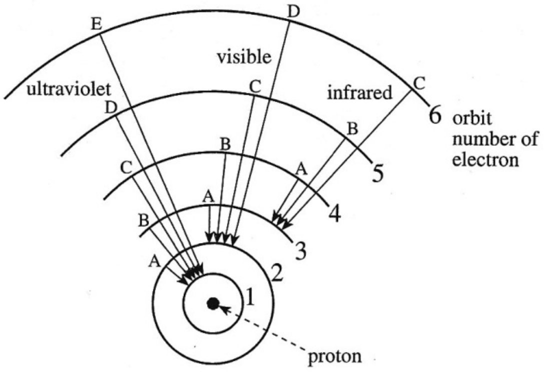


Figure 1

(Note: Diagram is not drawn to scale.)

Figure adapted from Edwin R. Jones and Richard L. Childers, *Contemporary College Physics.* ©1993 by Addison-Wesley Publishing Company, Inc.

Table 1

Type of photon	Jump	Energy of photon (eV)*	Wavelength of photon (nm)†
Ultraviolet	A	10.2	122
	B	12.1	103
	C	12.8	97.3
	D	13.1	94.9
	E	13.2	93.8
Visible	A	1.89	656
	B	2.55	486
	C	2.86	434
	D	3.02	410
Infrared	A	0.661	1,880
	B	0.967	1,280
	C	1.13	1,090

* eV = electron volt
† nm = nanometer

36. According to Figure 1, a hydrogen atom can emit any one of the 3 types of photons when the electron jumps from all of the following orbits EXCEPT:

F. Orbit 3.
G. Orbit 4.
H. Orbit 5.
J. Orbit 6.

37. When a hydrogen atom absorbs energy, the electron can jump from one orbit to another orbit of larger radius. Suppose the electron has jumped from Orbit 1 to Orbit 5 due to the absorption of the energy of a single photon. Based on Figure 1, it is most likely that the atom absorbed:

A. an ultraviolet photon.
B. a visible photon.
C. an infrared photon.
D. a photon that is neither ultraviolet, nor visible, nor infrared.

38. According to Table 1, the statement "As photon wavelength decreases, photon energy increases" is true for which types of photons?

F. Ultraviolet and visible only
G. Ultraviolet and infrared only
H. Visible and infrared only
J. Ultraviolet, visible, and infrared

39. According to Figure 1, if the electron in a hydrogen atom jumps from Orbit 6 to Orbit 3, and then jumps from Orbit 3 to Orbit 1, the atom will emit:

A. one infrared photon only.
B. one ultraviolet photon only.
C. one infrared photon, followed by one ultraviolet photon.
D. one ultraviolet photon, followed by one infrared photon.

GO ON TO THE NEXT PAGE.

40. Based on the information presented, which of the following statements about the relationship between the electron's orbit number and the energy of the hydrogen atom is most likely true?

F. As the electron's orbit number increases, the energy of the hydrogen atom increases.
G. As the electron's orbit number increases, the energy of the hydrogen atom decreases.
H. As the electron's orbit number increases, the energy of the hydrogen atom increases and then decreases.
J. As the electron's orbit number increases, the energy of the hydrogen atom remains the same.

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

TABLE 1
Procedures Used to Obtain Scale Scores from Raw Scores

On each of the four tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it off to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

ACT Test 0556B **Your Scale Score**

English _________

Mathematics _________

Reading _________

Science _________

Sum of scores _________

Composite score (sum ÷ 4) _________

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score. Now go to page 55 and use the table to convert raw scores on the subscore areas to scale subscores.

	Raw Scores				
Scale Score	**Test 1** English	**Test 2** Mathematics	**Test 3** Reading	**Test 4** Science	**Scale Score**
36	75	60	40	40	**36**
35	74	59	39	39	**35**
34	72-73	--	38	38	**34**
33	71	58	37	--	**33**
32	70	56-57	36	37	**32**
31	69	54-55	35	36	**31**
30	67-68	52-53	--	35	**30**
29	65-66	50-51	34	34	**29**
28	63-64	48-49	32-33	33	**28**
27	60-62	46-47	31	32	**27**
26	58-59	44-45	30	31	**26**
25	56-57	42-43	29	29-30	**25**
24	53-55	40-41	27-28	28	**24**
23	51-52	38-39	26	27	**23**
22	49-50	36-37	24-25	25-26	**22**
21	46-48	34-35	23	23-24	**21**
20	43-45	31-33	22	22	**20**
19	40-42	28-30	20-21	20-21	**19**
18	37-39	25-27	19	18-19	**18**
17	34-36	22-24	18	16-17	**17**
16	31-33	18-21	17	15	**16**
15	29-30	16-17	16	13-14	**15**
14	27-28	13-15	14-15	12	**14**
13	25-26	11-12	13	11	**13**
12	23-24	08-10	11-12	10	**12**
11	21-22	07	09-10	08-09	**11**
10	19-20	05-06	08	07	**10**
9	17-18	--	07	06	**9**
8	14-16	04	06	05	**8**
7	11-13	03	05	04	**7**
6	09-10	--	04	03	**6**
5	07-08	02	--	02	**5**
4	05-06	--	03	--	**4**
3	04	01	02	01	**3**
2	02-03	--	01	--	**2**
1	00-01	00	00	00	**1**

English					Ma	
1	**B**				1	**E**
2	**G**				2	**H**
3	**D**				3	**C**
4	**J**				4	**J**
5	**C**				5	**A**
6	**H**	41	**C**		6	**J**
7	**A**	42	**H**		7	**A**
8	**J**	43	**A**		8	**K**
9	**C**	44	**G**		9	**C**
10	**J**	45	**A**		10	**H**